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THE SCOTTISH GEOGRAPHICAL MAGAZINE

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THE SCOTTISH GEOGRAPHICAL MAGAZINE

PUBLISHED BY THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY
JOHN GUNN, D.Sc., HON. EDITOR
MARION I. NEWBIGIN, D.Sc., ACTING EDITOR

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THE SCOTTISH GEOGRAPHICAL MAGAZINE.

A SKETCH OF THE HISTORICAL GEOGRAPHY OF THE BLACK EARTH REGION OF CENTRAL RUSSIA.[1]

By A. M. Gillett.

(*With Sketch-Maps.*)

The region which has been selected for the purposes of this paper forms the central part of the great Black Earth zone of European Russia, which stretches in a broad belt from the Carpathian mountains to the Urals and beyond. And it is proposed to show in broad outline how, in that region, the course of history has, in a very special degree, been directed by certain fundamental geographical facts.

Geographically and historically Russia is the link which has joined Asia to Europe. The northern part of Russia is a section of the great northern European plain; the southern part is also comparatively low-lying but forms part of the steppe land belt which runs from the confines of China through Turkestan, the Kirghiz steppes and the Caspian Gate to the valley of the Danube and Hungary. This appears to be the pivotal fact of early and, indeed, of later Russian history—that Russia is a plain open on the east by way of the Uralo-Caspian Gate to the Asiatic influence which penetrated, almost entirely in the form of invasions of nomadic hordes, along the grassland route which led from the heart of Asia through southern Russia to the outposts of the steppe in Hungary. The factor which played the most important part in defining the area over which the nomads roamed was, however, not that of altitude but of vegetation. For south of a line from Kiev through Tula to Kazan, Russia presents a vast stretch of rolling plain formed of rich black earth soil easy to traverse and devoid of serious obstacles;

[1] A paper read before Section E (Geography) at the Edinburgh Meeting of the British Association.

whereas north of that line is a region of dense tree growth on sandy soils interspersed with bogs and swamps and lakes. This is the great and essential contrast between the northern and southern parts of European Russia, and it follows that the Asiatic nomads were confined in their wanderings to the southern steppe region and that their northern limit was marked by the merging of the open steppe plain into the forest zone.

Between the northern forested area and the southern steppe region there is, of course, a transition zone in which the warfare of forest and steppe has been waged. But more important than the actual struggle between the elements of forest and steppe is the reflection of that opposition in the history of the region—for we find that precisely where the natural elements came into conflict there took place the struggle between nomadism, based on the wide expanse of the steppe, and settled agricultural life with its roots in the small clearings of the forest: in other words, the struggle between the Russian settled peasant and the Tartar wanderer, and later between Muscovite officialdom and free Cossackdom.

It is with part of this transition zone that we propose to deal, that is to say, with Little Russia of the Middle Dnieper and the Central Russian Black Earth region or the region of the Oka-Don. It is a zone characterised from the start of historical times by a mixed forest-steppe vegetation which merges on the northern and southern borders respectively into the true forest belt and the pure steppe; so that both Little Russia and the Central Black Earth region show the same three zones of forest, forest-steppe, and steppe. But whereas from the twelfth to the eighteenth centuries the region of the Oka and the Upper Don was the buffer region at first for Suzdal-Riazan and then for Moscow in the war with the steppes, and may be defined historically as the region of the rapid advance during the sixteenth and seventeenth centuries of Great Russian colonisation, Little Russia, on the other hand, from the start of history to the eighteenth century played the same rôle in regard, not to Moscow, but to the Kiev centre, and came under the influence of a different complex of historical influences, namely, the Polish-Lithuanian.

Historic life in Russia began considerably later than in other parts of west and south Europe, and not many centuries before the birth of Christ. Previous to the Christian era successive waves of nomad peoples poured outwards from Asia, passed through the Caspian Gate, and overran the south Russian steppe. The most ancient inhabitants known were the Cimmerians, a group of people probably of Iranian origin, who in the sixth or fifth century B.C. were superseded by the Scythians. For a while the Scythians held the mastery over the steppe and came into close contact with the Greek culture of the Euxine shores; then the order weakened and power fell gradually into the hands of the Sarmatians, whose name became generally used for all the peoples of the south Russian steppe. About the time of the birth of Christ Alani hordes (of Sarmatian origin) obtained predominance. Shortly afterwards the Goths appeared from the Baltic shores and formed a large kingdom in eastern Europe; then in the fourth century A.D. the old Iranian people

in the steppe appear to have been replaced by the first representatives of the Turki people who belonged to a different Ural-Altaic group. These were the Huns. They, in turn, were followed two centuries later by the Bulgars and the Avars.

So, in the light of geographical considerations, it can be presumed that in the region of the Oka-Don and the Middle Dnieper, these nomads wandered only in the pure steppe of the southern part, and that if they ventured into the forest-steppe the gradually increasing density of tree growth proved at last an effective barrier. In the forest zone of northern Russia it seems clear that there lived, even many centuries before Christ, a hunting and fishing people of Finnic stock who came into contact in the transitional forest-steppe region with steppe nomads and semi-nomads. Thus in early days two zones were clearly defined—the northern forested one, inhabited by long-headed Finnic groups such as the Meres, Meshchera, and Mordva of the Oka-Don, and the southern steppe zone overrun by round-headed invaders from Asia. Then gradually from the west, from a centre of dispersion on the Carpathian Foreland, a third element made its appearance, so that by the start of the ninth century A.D. the Finns had for their western neighbours the Eastern Slav peoples. On linguistic evidence it is possible to conjecture that the first meeting of Slavs and Finns took place not later than the fifth to seventh centuries A.D., and that previous to that date, from the time of the birth of Christ, the western neighbours of the Finns were the Germans and Lithuanians, whilst the Slavs were still concentrated on the eastern slopes and plateaux of the Carpathians.

The Slavs, like the Finns, relied for protection upon the forested and swampy areas, and thus, from the ninth century, within Little Russia and the Central Black Earth region, the northern forested strip was held in its eastern part by Finns (Mordva, Meres, and Meshchera), and in the west by the easternmost groups of the Slav peoples (the Viatiches, Sieverians, Radimiches, and Poliani), whose gradual advance caused a Finnish retirement; the forest-steppe formed a neutral buffer zone between the semi-settled agricultural life based on the forest clearings and the nomadism of the steppe; and the steppe region itself was the seat of the Khazar empire which was established in the seventh century, and, though a nomad power, had widespread commercial relations (Fig. 1).

At this time the bulk of the Eastern Slavs were settled round the valley of the Middle and Upper Dnieper, which from earliest times had served as the main north to south trade route across the western part of the Russian plain. Kiev arose as a trading town on the Dnieper banks at that point where the forests of the north merged gradually into the southern steppe, and soon became, under Varangian or Norse rule, the chief town of Rus of the Dnieper. The participation of the Slavs in the trading enterprises of the time, and particularly in those of the Khazars, with whom friendly relations were maintained, led to the growth of trading districts centred round focal towns which sprang up usually on a river bank or near a portage way. These trading districts gradually became politically dependent upon the chief town, and de-

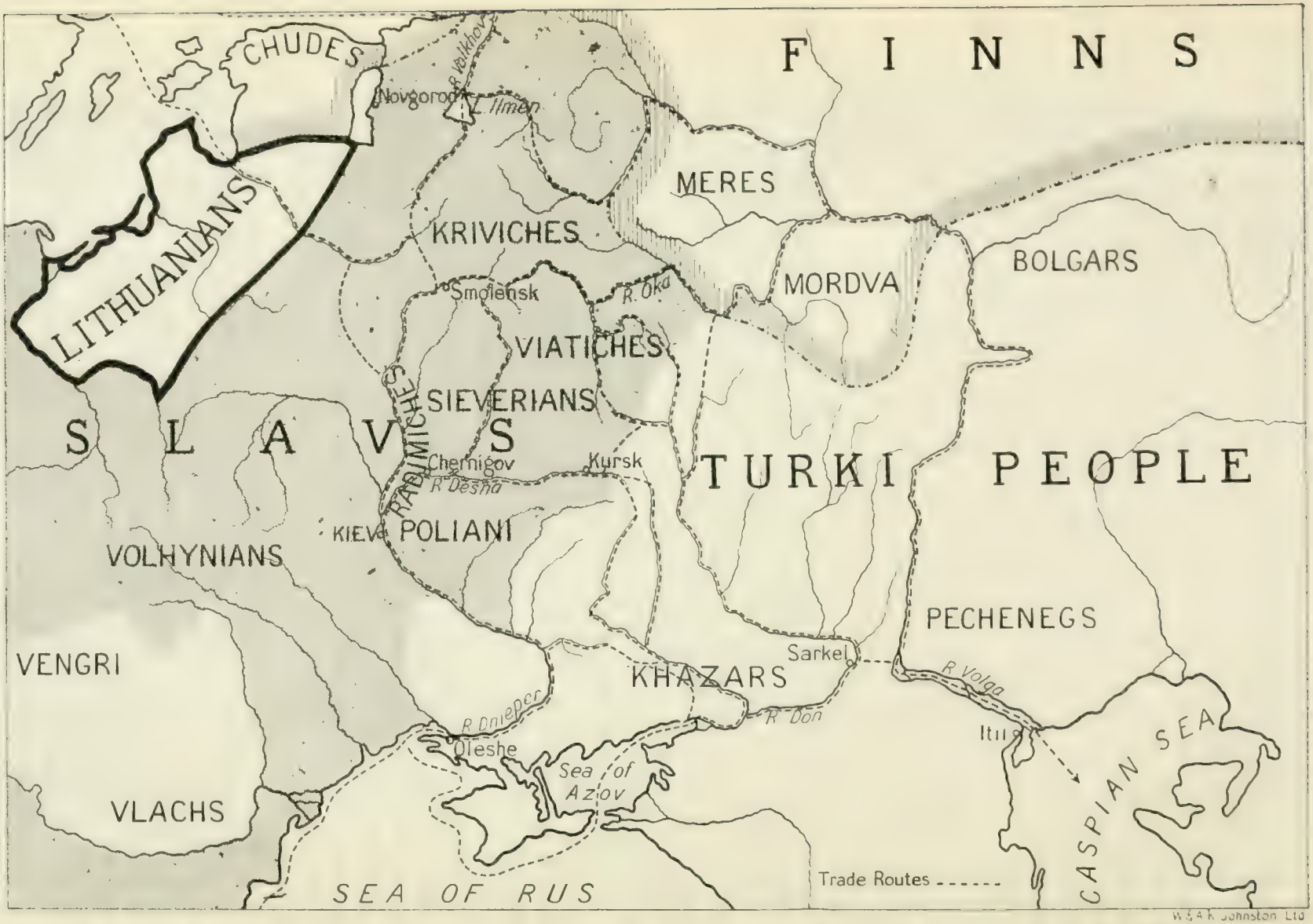


FIG. 1.—Southern Russia in the ninth century, showing the peoples of Little Russia and the Central Black Earth Region.

veloped into the town provinces which were in existence throughout the period of Kievan Rus.

The Slavic Sieverians, Poliani, and Viatiches of the forest strip of Little Russia and the Central Black Earth region, though sometimes in subjection to the nomads, as, for example, in the eighth century, when they were paying tribute to the Khazars, formed the outpost against the steppe of the Eastern Slavic world, and their land was the borderland between the semi-settled Slavs and the nomadic peoples. Because of this position on the border, and exposure to attack, the Viatiches, Poliani, and East Sieverians differed somewhat from the Dnieper Slavs, in that they were a wild, adventurous borderland people, difficult to subjugate, a product of the same circumstances which combined later to produce the Cossacks of Riazan, the Free Cossacks of the Dnieper and the Don, and in other parts of the world the backwoodsman and the frontiersman. Their land was the battleground on which was waged the conflict between the Slavs and the warlike Pechenegs, who in the tenth century, with their allied tribes, the Torks, had replaced the more peaceful trading Khazars. The Pechenegs were themselves quickly succeeded by the Polovtsi or Kumans, an extraordinarily numerous people, who remained in the Russian steppe until their conquest by the Tartars in 1240. The Polovtsi kingdom stretched from the Iron Gates of the Danube to the Ural River and beyond; it cut off entirely the Russian trade route of the Dnieper to the south, and Kievan Rus began to lose its importance. The Polovtsi advanced with their tents almost as far north as the Oka and pressed aside the remnants of the Meshchera people, so that certain measures of defence against the steppe proved essential, and during the later eleventh and twelfth centuries a number of fortified towns sprang up—Kursk, Riazan, Pronsk, Briansk, Tula and others. And there gradually appeared, too, in this transitional region on the steppe border of Little Russia and the Oka-Don a mixed semi-nomadic people known as Brodniki, who served Rus as a defensive outpost line. They were mainly Russian adventurers attracted by the call of the borderland, with an infusion of Khazar, Pecheneg, Tork, and Polovtsi elements; a product of the location of the region and a prototype of the later Cossacks.

The disruption of Kievan Rus in the twelfth century owing to social instability, and mainly to nomad attacks, led to emigration on a grand scale from the region of the Middle Dnieper, and the stream assumed two main directions. One stream moved west towards the upper parts of the Dniester and the western Bug, that is to say, to Galicia and Volhynia, which became for a time the most important provinces of the Russian land. Then with the rise of Lithuania in the fourteenth century, and of the combined kingdom of Poland-Lithuania, the south-western Russian lands were rapidly annexed, and old Kievan Rus became the south-easternmost border province, or the Ukraine of the Polish-Lithuanian kingdom; and it was the reflex exodus from that kingdom which finally peopled Little Russia with disaffected Little Russians. The second stream of emigration moved north-east towards the Oka and Upper Volga, and as a result of the meeting and fusing of

this stream of Russian colonisation with the Finnish people the great Russian stock evolved. The Moscow appanage gradually rose to a paramount position among the appanage kingdoms of Rus of the Volga, and it was the reflex exodus of disaffected elements from the Moscow Empire that provided colonising material in the Central Black Earth region.

The colonisation of Little Russia by Little Russians from the Polish-Lithuanian kingdom, and of the Central Black Earth region by Great Russians from the Muscovite Empire, was delayed, however, for a century or more by the Tartar invasions and the Tartar supremacy which lasted from 1240 to 1480. The dawn of the deliverance of Russia from the Tartar yoke coincided with the inauguration of the Russian advance into the steppe, and no sooner had the Grand Princes of Moscow thrown off the Mongol yoke in the fifteenth century than they began that eastward territorial expansion, preceded by the advance of Cossack outposts, which culminated in the occupation of Talienwan Bay and Port Arthur. From the end of the fifteenth to the close of the sixteenth century a perennial warfare was waged on the south-eastern frontier, for although the formal Tartar suzerainty was overthrown Tartar peoples of the Nogai and Crimean hordes continued to harass the Russian peoples. And since mutual grudges and misunderstandings between Poland-Lithuania and Moscow, caused by Moscow's attempt to consolidate the Russian land, led to a century's strife between the two states and prevented their combining against the steppe robbers, the Muscovite government had to employ special resources of its own.

It has already been shown that, even as early as during the Kievan period, there was a tendency for a wild population of adventurous spirits from Rus to collect on the frontiers who in large bodies were known as Brodniki. These hired themselves to tradesmen as fishers and hunters, or to the authorities as frontier police. In addition, a second element in the border population was formed by friendly Torks and Berendians, and later Polovtsi, who were employed as mercenaries by Rus. As early as the second half of the fourteenth century attempts were made by the principality of Riazan, which for a while rivalled Moscow, to colonise in the region of the Upper Don; and an important part in this attempt was played by special guards of the Riazan princes, chosen mainly from converted Tartars, who received the name of Cossack, and to whom official reference is first made in the chronicle in 1444. Items concerning the Dnieper Cossacks come later because collisions between Cossacks and Tartars began earlier in the Don region than farther west; but gradually the whole Cossack body became differentiated into two sections—the official Russian Cossacks who were brought under the authority of the Tsar of Moscow or the King of Poland, and whose duties were bound up with the maintenance of the official defensive expedients against the steppe in the frontier towns, and the Free Cossacks who lived beyond the frontier in the open steppe on the debatable ground between the Tartar nomads and the southern border of Russian settlement. The most famous of the independent self-governing military communities of the Free Cossacks were those of the

Don and of the Dnieper; but whereas the Don community was formed of Great Russians and was an organised body in the second half of the fifteenth century, the Dnieper or Zaporogian Cossacks were Little Russians driven out by social and religious reasons from the Polish-Lithuanian empire, and did not become important until after the start of the sixteenth century.

The gradual advance of Great Russian colonisation behind the Cossacks into the forest-steppe area of the Central Black Earth region in the sixteenth and seventeenth centuries, which took place at the same time as the Polish government was trying to extend to the steppes from the north-west and the region of official Polish Cossack settlement known as Hetmanschina was being formed, involved the construction of fortified lines designed to prevent Tartar penetration (Fig. 2, pp. 8-9). The middle of the sixteenth century saw the establishment of the first regular line—the Tula line—and its defence lay in the hands of the official Cossacks who were used by the Polish and Muscovite governments as buffers against the nomads. This regular and organised colonisation by the Moscow Empire pressed the Free Cossacks of the Middle Don into the lower course of the river and in part to the Volga where they gave rise to wandering bands of robber Cossacks. In the second half of the sixteenth century, too, the Cossack Free community increased incredibly in numbers owing to the influx of many serfs of the boyars and runaway peasants, and in this way the Ukraine, the Don basin, and the Lower Volga became filled with restless, homeless fugitives who awaited the opportunity to enter into a struggle with Moscow. With the appearance of Pretenders to the Throne the opportunity soon presented itself, and the alliance of the landless wanderers of the frontier with the foreign enemies of Russia during the period of the Time of Troubles furnishes an example of that spirit of restlessness and defection which is the natural product of the remoteness and independence of frontier life. Thus within the borders of Little Russia and of the Central Black Earth region the anarchical elements of the Russian community were gathered together with the general name of Cossacks under the banner of the Pretenders or of robber chiefs like Bolotnikov, Zaroutski, and Chmielnitski, and threatened the Muscovite and Polish Imperial Order. But in spite of this, Muscovite colonisation continued, and in little more than a century the fortified line of Moscow moved from the Oka halfway down the courses of the Donetz and the Don.

In the middle of the seventeenth century, after an unsuccessful rising of Zaporogian Cossacks against Poland, there appeared an eastward moving stream of the more independent Little Russian spirits, and this mass emigration was skilfully used by the Moscow Empire in its schemes of colonisation in the Central Black Earth region. The region of Little Russian Cossack settlement formed the Sloboda Ukraine; south of it the Free Cossacks of the Don were confined to the region of the Lower Don from Tsimliansk to the mouth, and in the years following 1667 the valleys of the eastern tributaries of the Don were settled by schismatic Old Believers.

This point virtually marks the end of the actual state colonisation

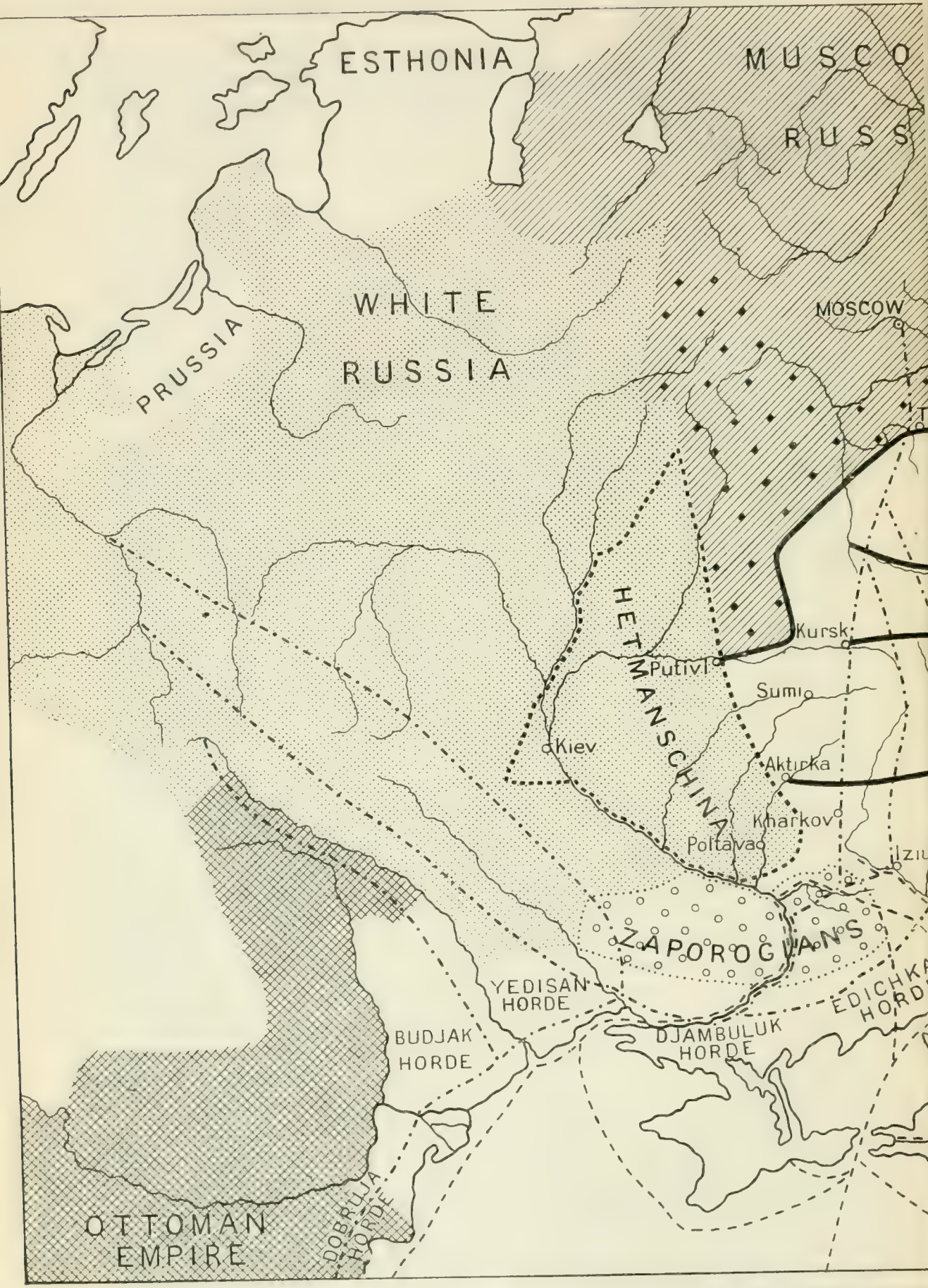
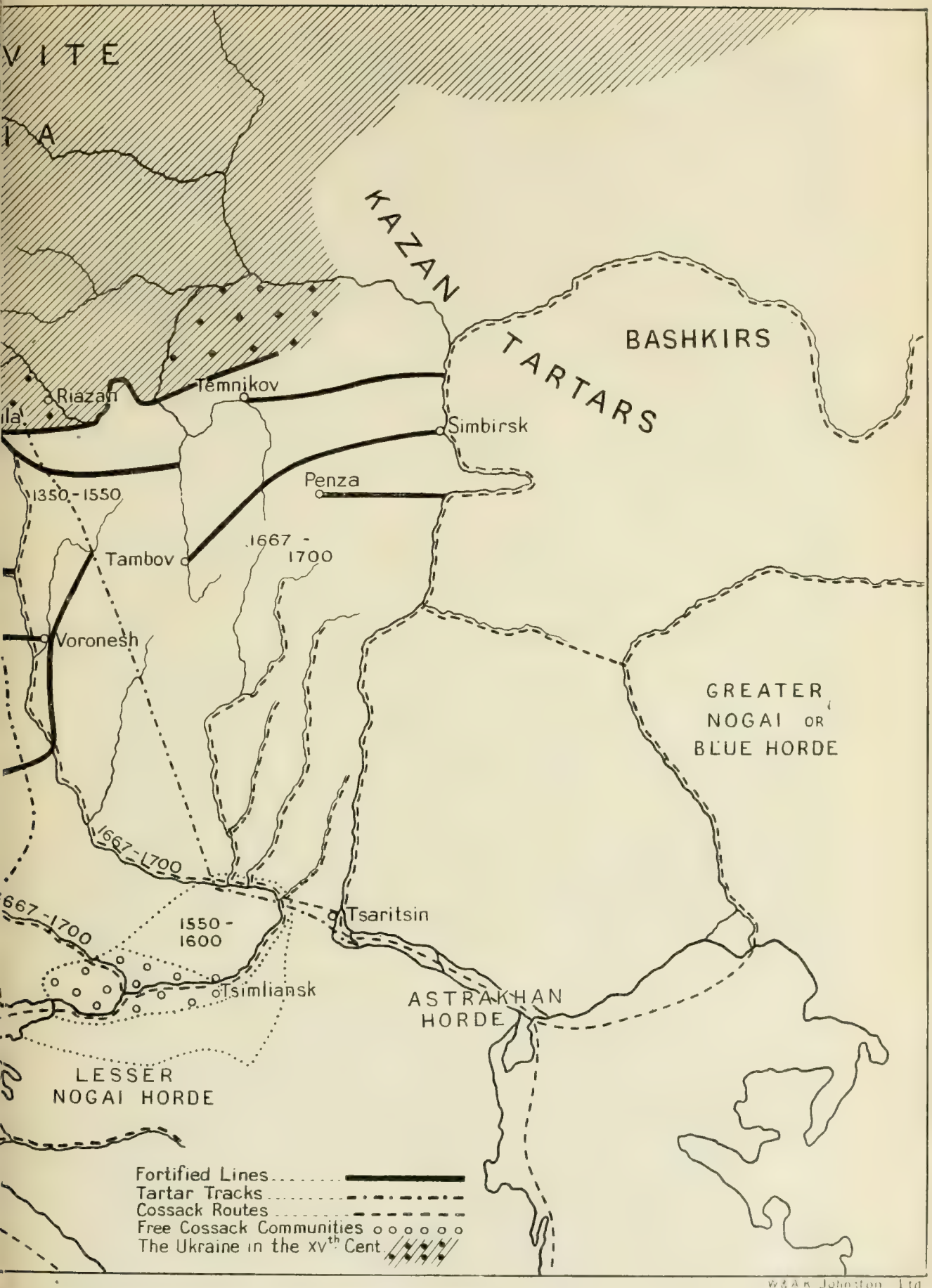


FIG 2. Russia from the fifteenth century onwards, showing



e advance of Great Russian colonisation into the steppes.

of the Central Black Earth region and Little Russia. Henceforth the population increased by natural growth and free influx. The eighteenth century saw the end of all possibility of nomad raids, the decline of the power of Poland, the incorporation of Little Russia and the Zaporogian Cossack territory within the Muscovite Empire, and the final subjection of the Don Cossacks. Thus we see that in Little Russia and the Central Black Earth region the passage of history brought the gradual triumph of settled life, and the advance of the Little Russian and the Great Russian who, unimpeded by any physical obstacles, came from the Polish kingdom and from the forests of the centre where the Muscovite Empire had its inception, to the forest steppe and to the pure steppe of the south. The process seems comparable to that which takes place when a shore-line, which for a long time has borne the brunt of the attack of the waves and yet has succeeded in keeping back the sea from entirely inundating the mainland, is gradually left high and dry by the retreat of the sea and becomes itself incorporated in the mainland and barely distinguishable from it.

APPLIED GEOGRAPHY.[1]

By D. G. Hogarth, M.A., D.Litt., C.M.G.

The term which I have taken for the title of my address has been in use for some years as a general designation of lendings or borrowings of geographical results, whether by a geographer who applies the material of his own science to another, or by a geologist or a meteorologist, or again an ethnologist or historian, who borrows of the geographer. Whether Geography makes the loan of her own motion or not, the interest in view, as it seems to me, is primarily that, not of Geography, but of another science or study. The open question whether that interest will be served better if the actual application be made by the geographer or by the other scientist or student does not concern us now.

Such applications are of the highest interest and value as studies, and, still more, as means of education. As studies, not merely are they links between sciences, but they tend to become new subjects of research, and to develop with time into independent sciences. As means of education they are used more generally, and prove themselves of higher potency than the pure sciences from which or to which, respectively, the loans are effected. But, in my view, Geography, thus applied, passes, in the process of application, into a foreign province and under another control. It is most proper, as well as most profitable, for a geographer to work in that foreign field; but, while he stays in it, he is, in military parlance, seconded.

[1] The Presidential Address to Section E (Geography) at the Edinburgh Meeting of the British Association.

Logical as this view appears to me, and often as, in fact, it has been stated or implied by others (for example, by one at least of my predecessors in this chair, Sir Charles Close, who delivered his presidential address to the section at the Portsmouth Meeting in 1911), it does not square with some conceptions of Geography put forward by high authorities of recent years. These represent differently the status of some of the studies, into which, as I maintain, Geography enters as a secondary element. In particular, there is a school, represented in this country, and more strongly in America, which claims for Geography what, in my view, is an historical or ethnological or even psychological study, using geographical data towards the solution of problems in its own field; and some even consider this not merely a function of true Geography, but its principal function now and for the future. Their "New Geography" is, and is to be, the study of "human response to land-forms." This is an extreme American statement: but the same idea is instinct in such utterances, more sober and guarded, as that of a great geographer, Dr. H. R. Mill, to the effect that the *ultimate* problem of Geography is "the demonstrative and quantitative proof of the control exercised by the Earth's crust on the mental processes of its inhabitants." Dr. Mill is too profound a man of science not to guard himself, by that saving word "ultimate," from such retorts as Professor Ellsworth Huntington, of Yale, has offered to the extreme American statement. If, the latter argued, Geography is actually the study of the human response to land-forms, then as a science it is in its infancy, or, rather, it has returned to a second childhood; for it has hardly begun to collect exact data to this particular end, or to treat them statistically, or to apply to them the methods of isolation that exact science demands. In this country geographers are less inclined to interpret "New Geography" on such revolutionary lines; but one suspects a tendency towards the American view in both their principles and their practice—in their choice of lines of inquiry or research and their choice of subjects for education. The concentration on Man, which characterises geographical teaching in the University of London, and the almost exclusive attention paid to Economic Geography in the geographical curricula of some other British Universities, make in that direction. In educational practice this bias does good rather than harm, if the geographer bears in mind that Geography proper has only one function to perform in regard to Man—namely, to investigate, account for, and state his distribution over terrestrial space—and that this function cannot be performed to any good purpose except upon a basis of Physical Geography—that is, on knowledge of the disposition and relation of the Earth's physical features, so far as ascertained to date. To deal with the effect of Man's distribution on his mental processes or political and economic action is to deal with him geographically indeed, but by applications of Geography to Psychology, to History, to Sociology, to Ethnology, to Economics, for the ends of these sciences; though the interests of Geography may be, and often are, well served in the process by reflection of light on its own

problems of distribution. If in instruction, as distinct from research, the geographer, realising that, when he introduces these subjects to his pupils, he will be teaching them, not Geography, but another science with the help of Geography, insists on their having been grounded previously or elsewhere in what he is to apply—namely, the facts of physical Distribution—all will be well. The application will be a sound step forward in education, more potent perhaps for training general intelligence than the teaching of pure Geography at the earlier stage, because making a wider and more compelling appeal to imaginative interest, and pointing the adolescent mind to a more complicated field of thought. But if Geography is applied to instruction in other sciences without the recipients having learned what it is in itself, then all will be wrong. The teacher will talk a language not understood, and the value of what he is applying cannot be appreciated by the pupils.

If I leave this argument there for the moment, it is with the intention of returning to it before I end to-day. It goes to the root, as it seems to me, of the unsatisfactory nature of much geographical instruction given at present in our islands. The actual policy of the English Board of Education seems to contemplate that Geography should be taught to secondary students only in connection with History. If this policy were realised in instructional practice by encouragement or compulsion of secondary students to undergo courses of Geography proper, with a view to promotion subsequently to classes in Historical Geography (*i.e.* if History be treated geographically by application of another science previously studied), it would be sound. But I gather from Sir Halford Mackinder's recent report that such is not the practice. Courses in Geography proper are not encouraged during the secondary period of education at all. Encouragement ceases with the primary period, at an age before which only the most elementary instruction in such a science can be assimilated—when, indeed, not much more can be expected of pupils than the memorising of those summary diagrammatic expressions of geographical results, which are maps. How these results have been arrived at, what sort of causes account for physical Distribution, how multifarious are its facts and features which maps cannot express even on the minutest scale—these things must be instilled into minds more robust than those of children under fourteen; and until some adequate idea of them has been imbibed it is little use to teach History geographically. So, at least, this matter seems to me.

It will be patent enough by now that I am maintaining Geography proper to be the study of the spatial Distribution of all features on the surface of this Earth. My view is, of course, neither novel nor rare. Almost all who of late years have discussed the scope of Geography have agreed that Distribution is of its essence. Among the most recent exponents of that view have been two Directors of the Oxford School, Sir Halford Mackinder and Professor Herbertson. When, however, I add that the study of Distribution, rightly understood, is the whole essential function of Geography, I part company from the theory of

some of my predecessors and contemporaries, and the practice of more. But our divergence will be found to be not serious ; for not only do I mean a great deal by the study of Distribution—quite enough for the function of any one science !—but I claim for Geography to the exclusion of any other science all study of spatial Distribution on the Earth's surface. This study has been its well-recognised function ever since a science of that name has come to be restricted to the features of the terrestrial surface—that is, ever since "Geography" in the eighteenth century had to abandon to its child Geology the study of what lies below that surface even as earlier it had abandoned the study of the firmament to an earlier child, Astronomy. Though Geography has borne other children since, who have grown to independent scientific life, none of these has robbed her of that one immemorial function. On the contrary, they call upon her still to exercise it on their behalf.

Let no one suppose that I mean by this study and this function merely what Professor Herbertson so indignantly repudiated for an adequate content of his science—Physiography *plus* descriptive Topography. Geography includes these things, of course, but she embraces also all investigation both of the actual Distribution of the Earth's superficial features and of the causes of the Distribution, the last a profound and intricate subject towards the solution of which she has to summon assistance from many other sciences and studies. She includes, further, in her field, for the accurate statement of actual Distribution, all the processes of Survey—a highly specialised function to the due performance of which other sciences again lend indispensable aid ; and, also, for the diagrammatic presentation of synthetised results for practical use, the equally highly specialised processes of Cartography. That seems to me an ample field, with more than sufficient variety of expert functions, for any one science. And I have not taken into account either the part Geography has to play in aiding other sciences, as they aid her, by application of her data, or, again, certain investigations of terrestrial phenomena, at present incumbent upon her, because special sciences to deal with them have not yet been developed—or, at least, fully developed—although their ultimate growth to independence can be foreseen or has already gone far. Such, for the moment, are Geodetic investigations, in this country at any rate. In Germany, I understand, Geodesy has attained already the status of a distinct specialism. Here the child has hardly separate existence. But beyond a doubt it will part from its parent, even as Oceanography has parted. Indeed some day, in a future far too distant to be foreseen now, many, or most, of the investigations which now occupy the chief attention of geographical researchers may cease to be necessary. A time must come when the actual Distribution of all phenomena on the Earth's surface will have been ascertained, and all the relief upon it, and every superficial feature which Cartography can possibly express in its diagrammatic way, will have been set out finally on the map. That moment, however, will not be the end of Geography as a science, for there will still

remain the investigation of the causes of Distribution, the scientific statement of its facts, and the application of these to other sciences. Let us not, however, worry about any ultimate restriction of the functions of our science. The discovery and correlation of all the facts of geographical Distribution and their final presentation in diagrammatic form are not much more imminent than the exhaustion of the material of any other science!

In the meantime, for a wholly indeterminate interval, let us see to it that all means of investigating the phenomena of spatial Distribution on the Earth be promoted, without discouragement of this or that tentative means as unscientific. The exploration of the terrestrial surface should be appreciated as a process of many necessary stages graduated from ignorance up to perfect knowledge. It is to the credit of the Royal Geographical Society that it has always encouraged tentative, and, if you like, unscientific first efforts of exploration, especially in parts of the world where, if every prospect pleases, Man is very vile. Unscientific explorations are often the only possible means to the beginning of knowledge. Where an ordinary compass cannot be used except at instant risk of death it is worth while to push in a succession of explorers unequipped with any scientific knowledge or apparatus at all, not merely to gain what few geographical data untrained eyes may see and uneducated memories retain, but to open a road on which ultimately a scientific explorer may hope to pass and work, because the local population has grown, by intercourse with his unscientific precursors, less hostile and more indifferent to his prying activities. There seems to me now and then to be too much criticism of Columbus. If he thought America was India, he had none the less found America.

I have claimed for the geographer's proper field the study of the causation of Distribution. I am aware that this claim has been, and is, denied to Geography by some students of the sciences which he necessarily calls to his help. But if a science is to be denied access to the fields of other sciences except it take service under them, what science shall be saved? I admit, however, that some disputes can hardly be avoided, where respective boundaries are not yet well delimited. Better delimitation is called for in the interest of Geography, because lack of definition, causing doubts and questions about her scope, confuses the distinction between the Science and its Application. The doubts are not really symptoms of anything wrong with Geography, but, since they may suggest to the popular mind that in fact something is wrong, they can be causes of disease. Their constant genesis is to be found in the history of a science, whose scope has not always been the same, but has contracted during the course of ages in certain directions while expanding in others. If, in the third century B.C., Eratosthenes had been asked what he meant by Geography, he would have replied, the science of all the physical environment of Man whether above, upon, or below the surface of the Earth, as well as of Man himself as a physical entity. He would have claimed for its field what lies between the farthest star

and the heart of our globe, and the nature and relation of everything composing the universe. Geography, in fact, was then not only the whole of Natural Science, as we understand the term, but also everything to which another term, Ethnology, might now be stretched at its very widest.

Look forward now across two thousand years to the end of the eighteenth century A.D. Geography has long become a Mother. She has conceived and borne Astronomy, Chemistry, Botany, Zoology, and many more children, of whom about the youngest is Geology. They have all existences separate from hers and stand on their own feet, but they preserve a filial connection with her and depend still on their Mother Science for a certain common service, while taking off her hands other services she once performed. Restricting the scope of her activities, they have set her free to develop new ones. In doing this she will conceive again and again and bear yet other children during the century to follow—Meteorology, Climatology, Oceanography, Ethnology, Anthropology, and more. Again, and still more narrowly, this new brood will limit the Mother's scope ; but ever and ever fecund, she will find fresh activities in the vast field of Earth knowledge, and once and again conceive anew. The latest child that she has borne and seen stand erect is, as I have said, Geodesy ; and she has not done with conceiving.

Ever losing sections of her original field and functions, ever adding new sections to them, Geography can hardly help suggesting doubts to others and even to herself. There must be a certain indefiniteness about a field on whose edges fresh specialisms are for ever developing towards a point at which they will break away to grow alone into new sciences. The Mother holds on awhile to the child, sharing its activities, loth to let go, perhaps even a little jealous of its growing independence. It has not been easy to say at any given moment where Geography's functions have ended and those of, say, Geology or Ethnology have begun. Moreover, it is inevitably asked about this fissiparous science from which function after function has detached itself to lead life apart—what, if the process continues, as it shows every sign of doing, will be left to Geography later or sooner? Will it not be split up among divers specialisms, and become in time a venerable memory? It is a natural, perhaps a necessary, question. But what is wholly unnecessary is that any answer should be returned which implies a doubt that Geography has a field of research and study essentially hers yesterday, to-day, and to-morrow ; still less which implies any suspicion that, because of her constant parturition of specialisms, Geography is, or is likely in any future that can be foreseen, to be moribund.

Since Geography, as I understand it, is a necessary factor in the study of all sciences, and must be applied to all if their students are to apprehend rightly the distribution of their own material, it is a necessary element in all education. Unless, on the one hand, its proper

study be supported by such means as the State, the Universities, and the great scientific Societies control, and on the other, its application to the instruction of youth be encouraged by the same bodies, the general scientific standard in these islands will suffer; our system of education will lack an instrument of the highest utility for both the inculcation of indispensable knowledge and the training of adolescent intelligence; and a vicious circle will be set up, trained teachers being lacking in quantity and quality to train pupils to a high enough standard to produce out of their number sufficient trained teachers to carry on the torch.

The present policy of the English Board of Education, as expressed in its practice, encourages a four years' break in the geographical training of the young, the break occurring between the ages of fourteen and eighteen, the best years of adolescent receptivity. If students are to be strangers to specifically geographical instruction during all that period, any geographical bent given to their minds before the age of fourteen is more than likely to have disappeared by the time they come to eighteen years. The habit of thinking geographically—that is, of considering group distribution—cannot have been formed; and the students, not having learned the real nature of the science applied, will not possess the groundwork necessary for the apprehension of the higher applications of Geography. Moreover, as Sir Halford Mackinder has rightly argued, an inevitable consequence of this policy is that the chief prizes and awards offered at the end of school-time are not to be gained by proficiency in Geography. Therefore, few students are likely to enter the University with direct encouragement to resume a subject dropped long before, at the end of the primary period of their education.

It is not, of course, the business of schools, primary and secondary, to train specialists. Therefore one does not ask that pure geographical science should have more than a small share of the compulsory curriculum. Only, that it have some share. If this is assured, then its applications, which on account of their highly educative influence deserve an equally compulsory but larger place in the curriculum, can be used to full advantage. The meaning and value of the geographical ingredient in mixed studies will stand good chance of being understood, and of exciting the lively interest of young students. In any case, only so will the Universities be likely to receive year by year students sufficiently grounded to make good use of higher geographical courses, and well enough disposed to Geography to pursue it as a higher study, and become in their turn competent teachers.

The obligation upon the Universities is the same in kind, but qualitatively greater. They have to provide not only the highest teaching, both in the pure science and its applications, but also such encouragements as will induce students of capacity to devote their period of residence to this subject. The first part of this obligatory provision has been recognised and met in varying degrees by nearly all

British Universities during the past quarter of a century. A valuable report compiled recently by that veteran champion, Sir John Keltie, shows that, in regard to Geography, endowment of professorial chairs, allocations of stipends to readers, lecturers, and tutors, supply of apparatus for research and instruction and organisation of "Honour" examinations, have made remarkable progress in our University world as a whole. But no single British University has yet provided all that is requisite or desired. Oxford and Cambridge, which have well-equipped geographical laboratories, still lack professorial chairs. Liverpool, maintaining a well-staffed Department of Geography, and London, which, between University College and the School of Economics, provides all the staff and apparatus required for teaching, have endowed Chairs; but they direct the attention of the holders to applications of Geography rather than to the pure science. So do also the University of Manchester and the University College of Wales, both of which maintain geographical professors.

All the Universities, with but one or two exceptions, examine in the subject to a high standard, that set by Cambridge being perhaps the highest over the whole field of properly geographical study. This latter University, also, has met the second part of her obligation to Geography by the organisation of an Honours course of instruction and classified examination, which, if pursued throughout a student's residence, is sufficient in itself to secure graduation. At Cambridge, therefore, Geography may be said to stand on a par with any other self-contained Final Subject. Neither in London nor in Manchester (I am not quite sure about Liverpool, but believe its case to be the same) is Geography, in and by itself, all sufficient yet to secure graduation, though at London the supplementary subject is so far identified with Geography that the final degree is taken in the latter subject. Oxford offers distinctly less encouragement at present than any of the Universities just mentioned. Her teaching and her examination standard are as advanced as the best of theirs, and the highest award which she gives for proficiency in Geography, her Diploma "with distinction," counts towards the B.A. degree as two-thirds of the whole qualification: but—and here 's the rub!—the balance has to be made up by proficiency in some other subject up to a pass, not an Honours standard. Therefore the resultant degree does not stand before the world as one taken in Honours; and, although some candidates are notified as distinguished and some not in the geographical part of her examinations, the distinction is not advertised in the form to which the public is accustomed—namely, an Honours list divided into classes. The net result is that an Oxford diploma, however brilliantly won, commands less recognition in the labour market than would a class in an Honour School or Tripos. It should, however, be mentioned—though an infrequent occurrence, not advertised by a class list, makes little impression on public opinion—that special geographical research, embodied in a thesis, can qualify at Oxford for higher degrees than the B.A.—viz., for the B.Litt. and B.Sc.—without the support of other subjects.

The reason of this equivocal status of Geography at Oxford is simply that, so far as the actual Faculties which control the courses for ordinary graduation are concerned, Geography is, in fact, an equivocal subject. No one Faculty feels that it can deal with the whole of it. The Arts Faculties will not accept responsibility for the elements of Natural and Mathematical Science which enter into its study and teaching—for example, into the investigation of the causes of Distribution, into the processes of Surveying, into Cartography, and into many other of its functions. Moreover, the traditional Oxford requirement of a literary basis for Arts studies is hard, if not impossible, to satisfy in Geography. The Faculty of Natural Science, on the other hand, is equally loth to be responsible for a subject which admits so much of the Arts element, especially into those applications of its data which enter most often into the instructional curriculum of adolescents—for example, its applications to History and to Ethnology.

At this moment, then, there is an *impasse* at Oxford similar to that (it is caused by the same reason) which prevents the election of a Geographer, as such, either to the Royal Society on the one hand or to the British Academy on the other. But ways out can be found if there be good will towards Geography, and such general recognition of the necessity of bringing it into closer relation with the established studies as was implied by the examiners in the Oxford School of Literæ Humaniores last year, when, in an official notice, they expressed their sense of a lack of it in the historical work with which they had to deal. Faculties are comparatively modern organisations at Oxford as at Cambridge for the control of teaching and examining. Before them existed Boards of Studies, appropriated to narrower subjects; and, indeed, such Boards have been constituted since Faculties became the rule and side by side with them. The Board, which at the first controlled at Oxford the Final Honour School of English, is an example and a valid precedent. Cambridge has found it possible to organise a mixed Board of Studies to manage a Final School of Geography, the Board being composed of representatives of both the Arts subjects and the Natural and Mathematical Sciences; and this acts apparently to the general satisfaction even in the absence of a professor of the special subject for whose teaching and testing it was formed. Why, then, should Oxford not do likewise? If Cambridge has not waited for the endowment of a professorial chair in Geography, need Oxford wait? I am well aware that, when at the latter University the School of English came into existence, there were already two Chairs appropriated to its subject; and I grant that Oxford will not have the very best of all guarantees that a high standard will be maintained in the instructional courses and the examinations in Geography, until there is a professor *ad hoc*. But guarantees sufficient for all practical purposes she could obtain to-morrow by composing a Board out of her existing teachers of Geography and kindred sciences.

For the last time, then, let me rehearse the too familiar "vicious

circle." The supply of good students depends on a supply of good teachers; the supply of good teachers depends on a supply of good students. If either supply fails, it is not Geography alone, but all sciences and studies that will be damnified; for all require the best of the help she can give in proportion as her science grows and improves. History will be able to call but indifferent Geography to her assistance, if this science has been understaffed and discouraged by official reluctance to allow it a place of its own in the sun. Is there not still some such reluctance on the part of the Board of Education, of some of our Universities, and of the Civil Service Commissioners?

THE RIFT VALLEYS OF EAST AFRICA.[1]

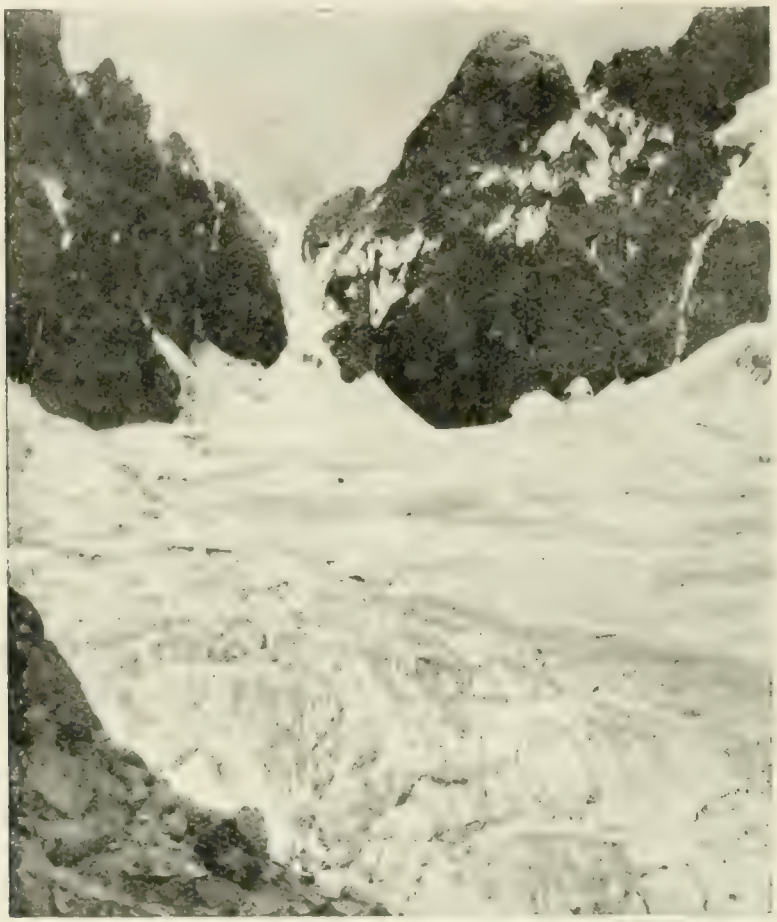
(With Illustrations.)

PROFESSOR GREGORY'S latest contribution to geography and geological research will be welcomed by the wide circle of readers interested in the development of East Africa, and the new British Colony of Kenya which forms a large part of that territory. The author has explored lands both tropical and frigid, from Africa to Australia and Spitsbergen, and this volume contains the results of two journeys made by himself, with a comprehensive summary of the work of many others during recent years in East Africa.

"The natural boundaries of the geographer," said Hugh Miller, "are rarely described by right lines; wherever these occur the geologist may look for something remarkable." It is with some of the most remarkable of these straight lines or long drawn furrows on the face of Mother Earth that Professor Gregory begins his profoundly interesting story. The vast straight trough of the Red Sea, whose parallel walls approach and run northwards by the Dead Sea and Jordan Valley, is a feature unique on the face of our planet. This stupendous gash does not end with the Red Sea, but is continued southwards through East Africa in a line of long fjord-like lakes, produced, not by glaciers, but by very distinct faults or fractures due to earth movements and the sinking of a strip of land between them. It has often, and indeed generally, steep rock faces on either side, and runs southwards, forming the cleft occupied by Lake Rudolf and Lake Nyasa, and terminating on the coast opposite Zanzibar. "The Great Rift Valley . . . extends from Lebanon to the Sabi River, and its branches reach eastward to the mouth of the Gulf of Aden and westward beyond Tanganyika to the rift valleys of the Central Congo. It is no local fracture, as its length is more than one-

[1] *The Rift Valleys and Geology of East Africa.* An account of the origin and history of the Rift Valleys of East Africa and their relation to the contemporary earth movements which transformed the geography of the world. With some account of the prehistoric stone implements, soils, water supply, and mineral resources of Kenya Colony. By J. W. Gregory, D.Sc., F.R.S. With many maps and illustrations. Pp. 479. London: Seeley, Service and Co., Ltd., 1921.

sixth of the circumference of the earth" (p. 23). But the writer deals with many other interesting and dissimilar things, from fossil corals to caves and edible cave-earth found in them. The Elgon Caves in British East Africa were discovered by Joseph Thomson in 1887, and he concluded they were of human origin, but Hobley, who visited them in 1897, believes they have been excavated by water at a period when the climate was moister than it is at present. In the Lumbwa district the caves occur in decomposed phonolite and phonolite tuff, and these appear



Mt. Kenya.

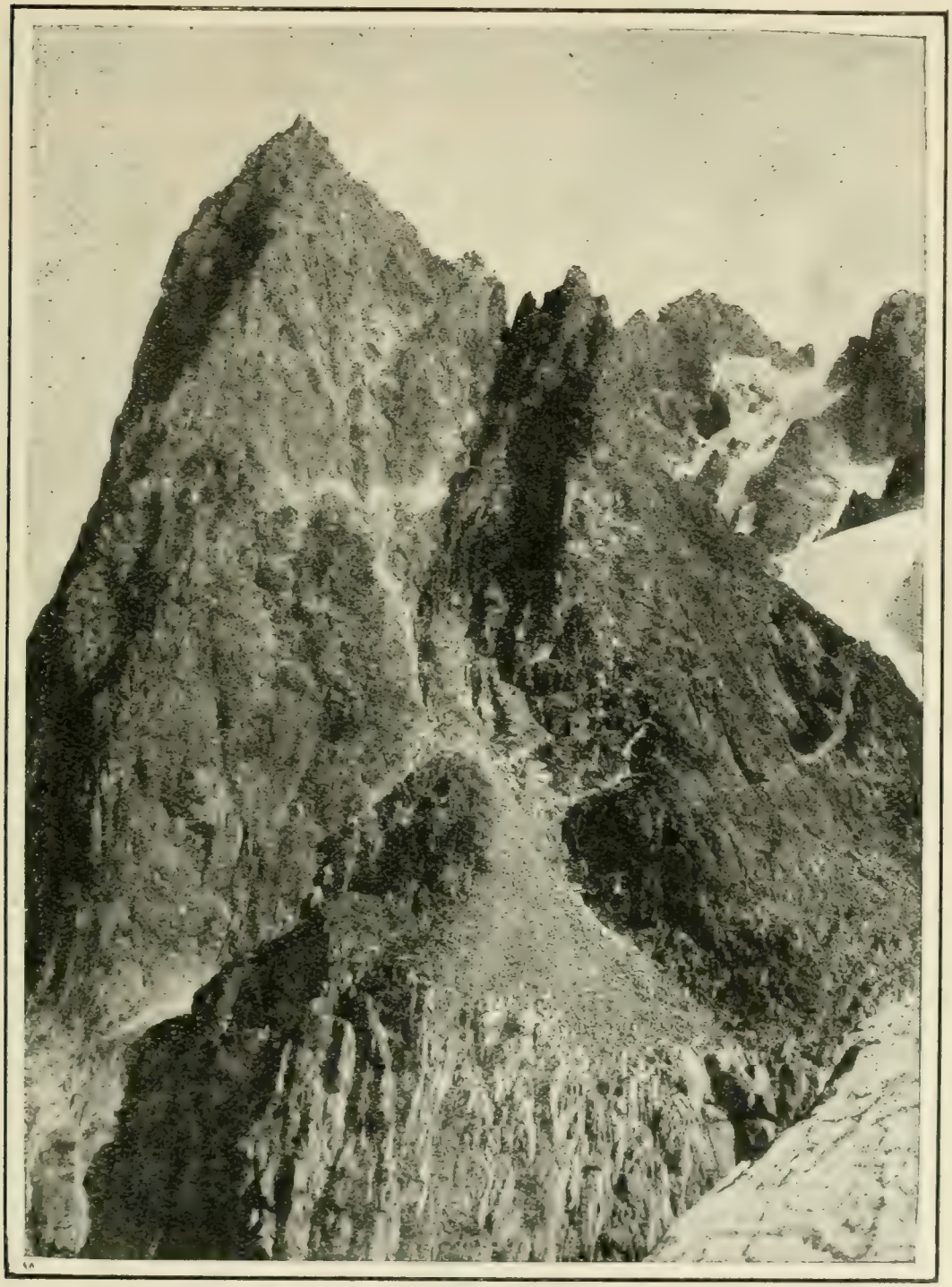
The Upper Part of the Tyndal Glacier, and the Western Arête of the Central Peak.

Photo by J. D. Melhuish, Esq.

to be of artificial and comparatively modern origin. The remarkable feature about them is their floor of soft earth, which is greedily devoured by goats and cattle, and believed by the natives to be of medicinal value to these animals. The earth has been analysed and found to contain over four per cent. of soda, and this appears to be the attractive constituent that assists animal digestion.

Chapter XX. deals with water supply, which is none too plentiful in British East Africa on account of the long dry intervals between the rainy seasons, the irregularity of the rainfall, and the high evaporation. The rainfall on the whole is, however, generous, and above the average,

and reaches sixty inches along the southern coast, but the northern part of British East Africa is dry and may have less than ten inches. There



The Eastern Face of Mt. Kenya.

Showing the vertical structure of the rocks, and the ice-worn rock surface.

Photo by J. D. Melhuish, Esq.

are usually two distinct rainy seasons, spring rains in March to May and smaller rains between October and December. Wells are therefore important and hints are given as to their location.

The mineral resources of the region are not promising, and soda is the only mineral that has been extensively worked in British East Africa at Lake Nagadi. Of coal very little has been found, and wood must always be the chief fuel. The soil is the main basis of its wealth and prospects, and some of the soil is very rich, derived from the disintegration of volcanic rock containing potash and phosphates well suited for the growth of coffee and flax.

Professor Gregory writes mainly as a geologist, but his valuable treatise is full of geographical lore of much interest, and his account of Mt. Kenya, discovered in 1849, describes a volcanic peak that he climbed in 1893 to within 600 feet of the summit. Mt. Kenya, although it stands actually on the Equator, has on its shoulders about fifteen glaciers which at one time were very much larger and descended to some 5000 feet below their existing limit. The height of Kenya has been variously calculated as between 17,040 and 23,000 feet, but the former figure is that which is now accepted. Some fine photographs—two of which by the courtesy of the publishers we are permitted to reproduce here—of this splendid peak show the glaciers and the rugged character of the volcanic rock mass. Numerous maps and geological sections and a good index add to the value of this admirable treatise.

H. M. C.

GALLOWAY: AN INTRODUCTORY STUDY.

By William A. Gauld.

(With Sketch-Map and Illustrations.)

It is almost five years since a change in the parliamentary arrangements restored the old historic entity of Galloway in the south-west part of Scotland, in the form of a political constituency embracing the two county divisions of Kirkcudbright and Wigtown. (1) [1] This revival was, in a very real sense, a recognition of the importance of the geographical conditions which have determined the individuality of the Province of the south-west, and its whole regional character. A region may be a unity in its physical nature, but without diversity within itself it can hardly have individuality, and in order to understand its whole activity we must inquire into the various factors which make up its composite life.

The "region" is itself nature-determined, and we may suppose that the various elements which it contains as a geographical unity are themselves "natural units."

An important clue to such units is often provided by the "regional names" (*noms de pays*) which, born of some distinct character of environ-

[1] The figures refer to the bibliography at the end of the paper.

ment or economy, have persisted in local usage from generation to generation. (2) The name "Galloway" itself goes back a considerable way in history, and was derived from the name Gallgaidhel, applied to the population of the Province in Norse or even pre-Norse days. As the "stranger Gaels" the Gallovidians of early times were alienated from the main body of the Scottish people, and the natural isolation due to the physical build of the region kept the Province apart from the real life of Scotland even down to the eleventh century.

Galloway is sometimes said to have extended far over the Ayrshire plain, but there is little evidence that it included more than upper Carrick beyond the limits of the present two counties. Carrick, however, was part of Wigtownshire until 1186 when it became separated, later, in 1221, to be joined to Kyle and Cunningham as the sheriffdom of Ayr. The hill area between the plains of Wigtown and Ayr must have remained in some degree an unoccupied neutral zone and thus emphasised the remoteness of the Province. Such historical facts as the long survival of the Pictish régime, the existence of native chiefdoms, the claimed right of "dux Galwelensium," and the alliances of Galloway with foreign powers in the formative political period are all consequent upon the natural isolation and independence of the peninsular kingdom. And long after Galloway had thrown in its lot with the Scottish realm, the local provincial tradition asserted itself, so that even in the fifteenth century it maintained its own civil and criminal code, and the Gaelic language persisted until the latter half of the sixteenth century. (3) The geographical unity of the Province has thus had a definite influence on some phases of its history, and the name "Galloway" itself denotes the historic persistency of its regional life. Within the Province local names indicate the primary political units, *e.g.* the "Shire" of Wigtown, the "Stewartry" of Kirkcudbright. The Stewartry, it is believed, originated out of the arrangements following the War of Independence. In 1369 Galloway east of the Cree (in thirteenth century, *criech*, Gaelic, later *creth* = a boundary) was granted to Archibald the Grim, an early Marcher earl who appointed a "steward" to collect his revenues and to administer justice there, and the name "Stewartry" survives to this day as the popular title of the eastern county. Galloway west of the Cree, however, had been to a large extent outside the sphere of the western march, but had naturally come under the control of a native nobility among whom the family of the Kennedy's was the most prominent. Notwithstanding, it remained under the jurisdiction of the king's sheriff from the Ayrshire side, whence the name "the Shire" which still obtains in the west. These two local names are historical rather than geographical, but they reflect the extra-provincial relationships, the one division sharing in the vicissitudes of marchland life and turned naturally to the Nith corridor as its economic outlet, the other linked to the Ayrshire plain by a uniformity of natural conditions.

Unity of locality within the larger units in the region is indicated by the usage of other local names: especially is this true of the western

county. Here are "the Rhinns" (Norse, *headlands*), the western promontory facing Ireland, "the Machers" (Norse, *plains*) between Luce Bay and Wigtown Bay, and "the Moors," the hill area north of a line from Newton Stewart to Glenluce. The last division is not recognised for administrative purposes, but the term is used in the text accompanying Pont's maps in Blaeu's Atlas (1655), and is still used by the Wigtown farmers. In the neighbouring county there are no such clearly defined localities, as hill and plain are less distinctive. In the northern portion, however, the area of the four parishes of Kells, Dalry, Balmaclellan, and Carsphairn, centred on the upper part of the Ken valley, is known as "the Glenkens." The local names have been referred to at some length, because their historic significance suggests that here, as in other areas, they serve to indicate the natural units within the larger region. Before an attempt is made to delimit these units, some consideration of the physical relations of the Province is necessary; regions no less than individuals are to be regarded not so much as independent and self-sufficient units, but rather as complex expressions of a larger and not necessarily definable whole.

The Physiography of the Region.—Galloway lies at the western end of the Southern Uplands; it is divided on the east by the Nith corridor from the Moffat-Lammermuir hills, whose evenly-rounded outlines and flat-topped summits contrast with the Galloway highlands, indurated by the intruded plutonic granites, and showing as a rule more rugged features. This is well seen in the metamorphosed aureole of Merrick-Kells, which surrounds the Loch Dee granite boss. (4) The general level of the peaks, and the platform character of much of the country, suggest that marine denudation has played a considerable part in its physical evolution. The fundamental rock groups of the Province were laid down in the Ordovician and Silurian periods, when the area of "proto-Galloway" formed the marginal sea of the advancing continental shore to the north-west. The tectonic movement which initiated the great Rift Valley of Central Scotland also folded the older Palæozoic rocks of the south-west in a series of NE.-SW. folds parallel to the line of "Caledonian" faulting. A later phase of movement in mid-Devonian times caused a further subsidence in Central Scotland, and necessitated a readjustment in the rocks on either side of the rift. The intruded granitic bosses of Galloway represent the final movement associated with the lowering of the Midland valley floor. The subsequent marine transgressions are not always determinable, but the outflanking nature of the Carboniferous seas is shown by the marginal depositions of Nithsdale, the Kirkbean shore, and the Loch Ryan area. A general terrestrial recovery set in during the Mesozoic epoch, but there were periods of marine invasion especially in Jurassic and Cretaceous times. There is evidence to show that in the time of the late Chalk, the Southern Uplands were at least reduced to an island archipelago, and perhaps even underwent a complete submergence. The terraced land-forms recorded by Dr. Mort in Arran are also found in the Galloway uplands, and both

are in all probability post-Cretaceous in date. Professor Cole has argued that many immature features on the surface of the Irish Carboniferous floor are due to a capping of chalk which protected the underlying strata down to the close of the Ice age. A similar Cretaceous floor may very well have preserved the original Silurian topography of Galloway in its peneplain form, and the character of many of the streams, *e.g.* the affluents of the Nith, points to their having developed on a landscape superimposed on the older Palaeozoic country. This transgression of the Chalk sea heralded the collapse of the North Atlantic area which occurred simultaneously with the emergence of Europe in early Miocene times.

Fig. 1. – Loch Enoch, looking north, with *roches moutonnées* in the foreground.

The Tertiary period saw another great outburst of sub-crustal activity in the north-west Volcanic Province, when the Antrim basalts, the bosses of the Mourne Mountains and Arran, and the great mid-Scotland dykes came into being. The plateau lands of Galloway seem to bear little evidence of all this storm and stress, but the foundering of the Solway basin and the trough of the Irish Channel were incidents in the general collapse of the north-western margins.

Such in outline are some of the major phases in the physical evolution of Galloway. The removal of the more recent deposits by the processes of sub-aerial and marine denudation has laid bare the older grain of the original floor. The complexity of the rock succession, which baffled geologists until Lapworth brought forward the fossiliferous evidence of the graptolitic shales, is due to the fan-folding which must

have occurred just previous to the great rift subsidence on the north side of the south-west tableland.

The existing land-forms, however, bear little relation to this structure, but rather appear as relics of the residual plateau worn down from the original anticlinal fan-folds.

The characteristic rock is a coarse-grained greywacke which is associated with fissile flagstones, and exposed in long lenticular areas in the line of strike (NE.-SW.) are the carbonaceous shales with the graptolitic fauna.

The three granite bosses of Loch Dee, Cairnsmore of Fleet, and Criffel are themselves indicative of the extent of denudation, for it has been demonstrated (5) that the sediments overlying the intrusive granites must have been removed and the igneous rocks disclosed before upper Old Red times. The numerous smaller bosses, the dykes and veins and the metamorphism notable in the Ordovician rocks all suggest the share which the Galloway tableland had in the continuous instability of North-Western Britain.

The alteration of the rocks by intrusions has had an important influence on the river development of later times, *e.g.* in the Galloway "cauldron," between the Merrick and the Kells ranges, the ring of altered Ordovician grits and shales around the Dee granite has prevented a radial drainage attacking the lake-filled basins and has in fact preserved the glacial topography.

In addition to the folding movements with SW.-NE. trend great fracture lines appeared across the strike of the rocks in a general north to south direction; the great pre-Carboniferous fault of the Nith valley and the contemporaneous Loch Ryan fault are of this character, and the parallelism of the Luce, Duisk-Bladnoch, and Doon-Ken drainage basins is a feature which suggests a very early use of tectonic lines of weakness by a consequent drainage system. In his admirable paper (4) Dr. Mort has shown how this original consequent system had developed on the Palaeozoic floor tilted to the south-east; the streams originated in Kintyre and Argyll, he believes, and flowing across the site of the present Midland valley found an outlet in the North Sea area. The mid-Devonian faulting broke up this system and the old valley lines trenched in the south-western plateau were covered by later sediments. The present-day streams are however of much more recent origin, and only occupy in part the old valley courses. The studies of Professor Gregory on Arran and the Tweed valley (6, 7) show that we must look for the origin of this later system in the volcanic period of uplift affecting the north-west of Britain in Pliocene times. Again, the cutting power of the streams working in the newer and softer deposits enflanking the Galloway plateau were such as to prevent any revival of the old transverse rivers, and, as Mort says, the Galloway streams were "beheaded at both ends."

The Ice age brought further modifications, notably the deepening of portions of the valley floors. Thus the middle Cree valley was

deepened to the extent of at least 50 feet, as is proved by the tributary Cardorcan stream on the left bank of the "Loch of Cree" which descends in a 50-feet cascade into the Cree.

A very striking contrast in river-valley formation is seen in the upper part of the Glenkens valley. Above the village of Carsphairn the two main tributaries, the Upper Deugh and the Carsphairn Lane, unite to form the Water of Deugh. The Upper Deugh is a torrential stream broken by waterfalls, cutting through thick walls of boulder clay and gravelly sands, while the flow is checked by its boulder-strewn channel and the level stretches of deep and still water. The Lane on the other hand is a slow meandering stream, muddy and reed-infested. Its valley is a

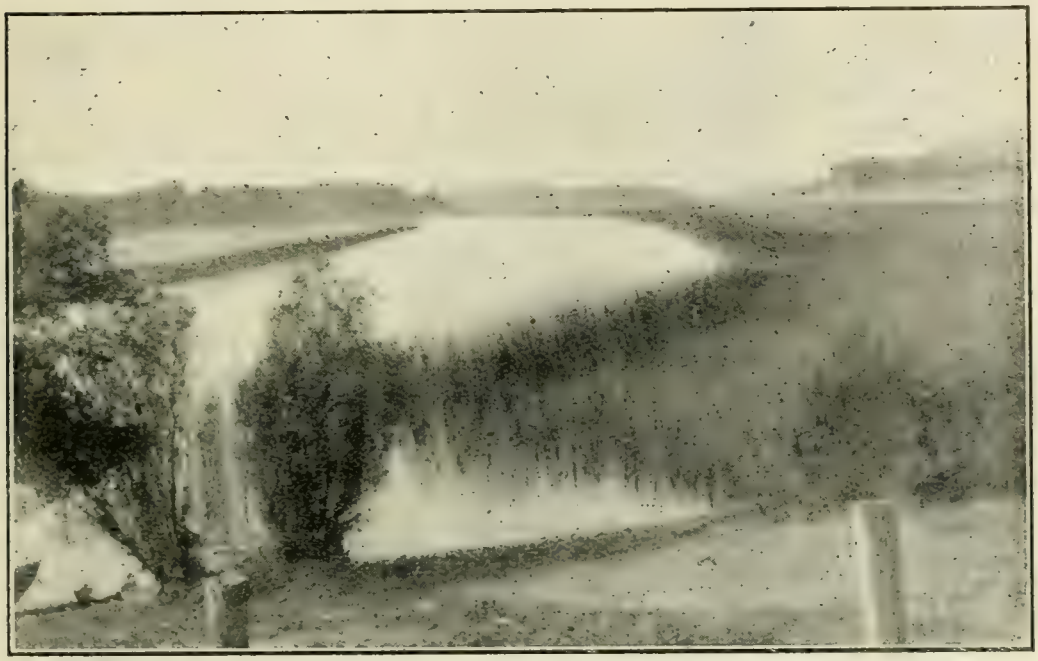


FIG. 2.—The "Loch of Cree": the middle portion of the Cree valley, deepened in the glacial period.

uniformly wide one and the stream is obviously a "misfit," being in fact post-glacial in date and occupying part of a far older and matured valley line which extended north-west along the line of the northern portion of Loch Doon, and probably across the courses of the present Ayrshire streams. There are abundant illustrations of river capture, especially in the north-west borders where the Midland valley strike-streams have been able by working in soft rocks to tap the headstreams of the Galloway rivers; *e.g.* the Feoch burn, a tributary of the Duisk, has tapped the Cumnock burn since glacial times.

Again, the river terraces which are a common feature are probably associated in their origin with the raised beaches of the Solway shore line. Many of the Galloway streams have been rejuvenated near their mouths, especially where they debouch into the raised beach estuaries, and hence the lower portions of the streams are often younger than the

upper.[1] The river systems of Galloway make an interesting physiographic study, for they exhibit the cumulative influence of the topographical conditions of successive geological phases. Although we cannot enter here into the problem, it is perhaps permissible to refer to the general uniformity of width and level in the central portions of such rivers as the Cree and Ken Dee, which may be due to glacial erosion at the upper end of such stretches of river, or possibly to the fact that in these sections the rivers are flowing in the old consequent valleys of the Palaeozoic floor partly filled with boulder clay. The name "lane" is very frequently applied to the slow moving streams of Galloway in hill and plain areas alike. The considerable width and the low gradient of the north south valleys has facilitated trans-plateau communication, and these river valleys have formed the main lines of human migration in historic and prehistoric times.

Structurally, Galloway has much in common with the Southern Uplands east of Nithsdale, but its granitic bosses, its major drainage lines, and its glacial features have given it a unique and peculiar topography.

The Climate of Galloway.—In considering the climatic régime of any individual region such as Galloway, two groups of factors must be examined: (*a*) the position of the region in the general climatic control of its latitude, (*b*) the modifications resultant on influences within the region or its vicinity interpreted as local weather. The latter group is secondary and even consequent on the first or major group.

Galloway exhibits all the features of the west-coast type, sharing in the general pressure conditions of the European land mass and the North Atlantic. A small fluctuation in the relative position or intensity of the pressure systems causes a change in British weather as a whole. The Province is open on the south and west coasts to sea influences, and the effect of the Atlantic warmth is seen in the milder conditions of the coastal margins, while the climatic variations inland are determined by the orographical nature of the country. Pressure conditions are in the main outside the control of local influences. The periodicity of cyclones and anticyclones is the principal cause of variation in the general mean pressure. Charts of the paths frequented by cyclonic depressions in North-West Europe show a wide storm belt running from south-west to north-east off the north-west shores of the British Isles. This belt predominates throughout the year but is weakened in the months April, May, and June, *i.e.* in the period of the break up of the Icelandic low pressure in the spring, connected no doubt with the maximum influence of the East Icelandic water, and the spread northwards of the Azores "high" pressure system. From this main belt, which provides the prevalent south-westerlies, branches extend eastwards which frequently cross the Scottish mainland. In the months October to December such a branch runs from west to east across the Province. In the spring

[1] I owe this idea to Dr. Peach.

months Galloway lies outside the storm path, as the Southern Uplands divide a belt in the Irish Sea from one extending across Central Scotland. The pressure data are very incomplete and the seasonal control is not absolutely clear, but the fluctuations in the spring and summer weather are probably due to the interaction and relative power of the storms in these complementary belts, when the main storm belt is at its minimum farther to the west. In the autumn the south-west to north-east storm path is restored and winter conditions and cyclonic disturbances return.

The prevailing winds are westerlies and south-westerlies, but when the cyclones occupy the Solway storm track, the winds in the Galloway uplands back from east through north-east to north-west and give cold and often dry weather. The spring east winds which condition so much the agricultural growth in that season are due to the anticyclonic conditions existing to the north of Scotland. These arise from continental high pressures which force the cyclonic belts westwards. Clear nocturnal conditions in spring are often accompanied by frosts.

In the Whithorn peninsula of the southern Machers, the farmers use their wind-pumps as weather guides, and they affirm that if the wind during the day follows the sun, the weather will be fine, and it is in fact true that the wind veers from south-east to south-west in the course of fine weather. It is also maintained locally that if the seaward view is clear enough to display both the Kirkcudbright coast and the Isle of Man, a wet spell will follow.

In summer the land and sea breeze type of weather prevails, and the diurnal north-west winds, especially in Wigtown, dying down in the evening, have given rise to an old Galloway proverb, "An honest man and the north-west wind go to sleep together."

As regards temperature, the main direction of the isotherms over the Province is from north to south, owing to the uniformity in all the west coasts of Atlantic warmth. In general, the mean temperature in Wigtown is higher than that of the eastern county. The average temperatures (Fahrenheit) are as follows :—

Kirkcudbright, . . .	Jan., 38°	July, 59°
Wigtown, ...	Jan., 40°	July, 58°

In the summer months a wedge of maximum heat is projected westward between the more equable sea area to the south and the cooler Midland valley on the north of the Uplands. In general the coast stations like Cally and the Mull show less extremes than such interior places as Kirkcowan ; the tendency to a spring minimum is a most notable feature in the Solway stations. The mists which are common in the hill-district valleys seem to depend on temperature conditions. The moisture-bearing westerlies, having lost much of their rain content on first contact with the western slopes, are pulled down in the form of mist by cooler strata in the hill valleys farther east ; in the summer this is a characteristic feature in the evening after a warm cloudless day. Thunderstorms often follow the line of the main river valleys. In the Glenkens, for example,

thunderclouds are often seen travelling up the Dee from seawards to the vicinity of Loch Ken and then west into the hill country, later returning across the Ken valley and down the Water of Urr to the Castle-Douglas plain.

The normal Scottish type of rainfall is characterised by an even distribution throughout the year, with a tendency towards a spring minimum and an autumn maximum. This type is seen in general in Galloway, although west of the Cree the period of maximum rainfall tends to be in winter rather than the autumn. The bulk of the Province has 40 inches of rain in the year, and variations within the 40 inches isohyet are dependent on orographical features. (8) The area with under 40 inches is confined to the Rhinns and Machers and the southern margins of the Kirkcudbright tableland, the minimum being registered at the Mull of Galloway (26·81 inches). The 40-50 inches zone develops to a wider extent and includes all the area above the 40-inches isohyet to the 250-feet contour line, and is mainly confined to the eastern county, although in wet years it extends into the upper portion of the Luce Water farther west. The 50-60 inches zone occupies the ground up to 800 feet inside the 40-50 inches zone. The intimate connection between topography and rainfall is especially well defined in Kirkcudbright where the increase is from south to north, while in Wigtown it is west to east against the foothills. The following figures illustrate the seasonal distribution :—(9)

Station.	Winter. (D.J.F.)	Spring. (M.A.M.)	Summer. (J.J.A.)	Autumn. (S.O.N.)
Cally, . . .	14·67 ins.	8·93 ins.	10·80 ins.	15·40 ins.
Corsewall, . .	10·0	6·62	7·61	10·43
Drumlanrig, .	15·31	8·22	10·12	14·03
Kirkcowan, . .	16·49	8·67	10·21	13·82
Mull of Galloway,	7·53	4·68	6·23	8·37
New Galloway, .	15·74	8·90	9·94	18·89

It is interesting to note in the monthly maps how the conditions in the Nith valley serve to indicate the fluctuations in rainfall. In the wetter months of winter and late autumn the zone of 50-60 inches annual rain extends across the Upper Nith valley to join a similar zone in the Lead-hills area. In late spring and early summer, when a general drying-up occurs, this wet belt is broken up and the dry Nith valley becomes a "through" corridor. The rainfall station of Drumlanrig is in this transitional foothill type of rain zone, between the true hill type of heavy rains and the drier coast type prolonged up the Nith valley. In the hill country, stations with a westerly aspect record heavier rainfall than those facing eastwards, but there are a few exceptions to the rule ; *e.g.* the Shiel of Castlemaddy in the Glenkens records a larger rainfall (77·54 inches) than the Glenhead of Trool (71·62 inches), although the latter has a westerly aspect. This leeward maximum is a well-known feature in the English Lake District, and its occurrence in Galloway is therefore an interesting parallel. Both of the stations named occupy narrow

valleys, especially Glenhead, which lies at the eastern end of the Trool Glen at an elevation, however, of only 320 feet, while the Shiel farm stands at 850 feet. Apart from the difference in elevation, the fact that the Trool station lies in a valley parallel to the direction of the rain wind, while the Shiel is in a valley which is transverse to the prevailing wind, may account for the maximum on the leeward slope.

The mildness of the climate is very largely due to the prevailing warm sea winds and the latent heat set free by frequent precipitation.

The Influence of Climate on Agriculture.—To the farmer the seasonal conditions of climate are all important, as they may be said to determine the forms of husbandry. The highly developed dairy-farming of the Rhinns and Machers, and the coastal belt of Kirkcudbright, and the inland sheep grass farms of both counties may be said to reflect the orographical nature of the rainfall and temperature distribution. Again, so far as temperature is concerned, Galloway is able to grow wheat, but the heavy autumnal rains and the absence of bright sunshine exclude that cereal on any considerable scale. The December-January maximum of rainfall in Wigtown enables wheat to be grown to a small extent there, and in such coastal parishes of Kirkcudbright as have sufficient sunshine, *e.g.* Rerrick.

In early summer the moisture of most of the Province is favourable to turnip sowing as the turnip fly is only active in a dry season, when it often necessitates re-sowing. The liability of mangolds to frosts restricts them to the coastal and low-lying areas near the sea. Root crops do well with cool rather than wet summers and thrive best away from the hill rain belt, in the Machers and the coastal regions. The prevalence of moist conditions thus makes Galloway pre-eminently a pastoral county, and the mild climate, especially in the west, permits of cattle being pastured in the fields for the greater part of the year. Along the coast the control of local weather by sea conditions is suggested in such proverbs as that of Kirkcudbright itself, "If rain with the ebb, go to bed; if with the flow, go to the plough."

Spring frosts delay the growth of the oats crop, and are often accentuated in the low-lying farmlands by the proximity of cold peat bogs interspersed in the hollows between cultivated eskers and sand, gravel soils or drums. The September frosts, if not too severe, are regarded as beneficial, as they complete the preparation of the corn crop for harvest, but a late spell of autumnal frost is hard on the potato crop. The spring drought is a well-known feature and the farmers in Galloway as elsewhere set great value on "March dust." The preponderance of overcast skies in the ripening period is the great drawback to agriculture. The cool moist summers with spasmodic sunshine make it necessary to specialise in moisture-loving plants, and it is just these which suffer from spring droughts; turnips on sandy soils often fail for this reason.

The Lammas floods of the end of July and beginning of August before the harvest period do great damage to the meadow hay crops and are usually accompanied by high west winds.

Plant Geography.—The natural vegetation of a region is conditioned by the physical geography and in particular by the character of its climate and structure. similar vegetation types recur with the same physical environment, and a community of different species adapted in a variety of ways to one environment gives rise to a "plant association." Much good geographical work has been done in Scotland in arranging plant associations in particular zones related to the prevalent human conditions. The fine pioneer work of Robert Smith is well known, and his zones have been largely accepted as standards to work on in other

FIG. 3.—Coast at Ravenshall, Wigtown Bay.

areas. Although no detailed survey has as yet been done in the south-west of Scotland, the following zones seem fairly well defined :—

1. The littoral zone, including the submerged, salt marsh and sand-dune vegetation.

2. The agrarian zone, 0-500 feet, divided between deciduous woodland and cultivated land.

3. The hill-pasture zone, 500-1000 feet.

4. The moorland and sub-alpine zone, 1000-2000 feet.

5. The alpine zone, above 2000 feet.

The littoral zone is distinguished from all others by the part which salt plays in the plant environment ; it is divided into a lower and an upper belt, the former within the tidal area with Zostera as the typical plant, the latter the "saltings" area of sandy shore and salt marsh overrun by spring tides only. The "saltings" belt is very well developed on

the Galloway coast with its extensive raised beaches and wide estuarine levels. Where drainage and reclamation have been effected, the saltings provide good grazing land for dairy and stock cattle, but are not well suited for sheep. The Galloway coast was formerly the seat of a large salt industry, the existence of which was based on the natural "pans" or wide depressions and creeks in the salt marsh. The coast is being rapidly eroded in the Rhinns peninsula and the littoral plants tend to spread inland. The "blown sand" areas are largely due to tidal drift ; the largest distribution is seen at Torrs Warren between Glenluce and Sandhead.

The agrarian zone includes both cultivated and grazing lands, park lands, and estates. The limits of cultivation are fixed to some extent by the relative exposure and altitude, and are very largely determined by the thinning out of the glacial deposits. Gorse (*Ulex europæus*) tends to occupy the driftless outcrops of rock in the farming zone ; *e.g.* in the Whithorn peninsula ridges of gorse and briar bush divide the grass-park hollows. Crop rotation is largely limited by elevation, and the cultivation of mangolds, wheat, and the finer barleys ceases away from the lowlands and coast margins, the upland farms being limited to oats, turnips, and bere (coarse barley). The meadow-grass land of the alluvial "holms" margins the lower and middle courses of the main streams, and is characterised by a rush and marsh plant association.

Cultivation has cleared the major portion of the natural deciduous forest, but in early historic times the agrarian zone was covered with oak, birch, and scrub. About 3 per cent. of the Province is now occupied by woodland ; oak and beech are characteristic, with Scots pine on the upper exposed margins. Beech, larch, and spruce have been the principal plantation trees, while the uncultivated alluvial deposits have willow, alder, and ash. The long woodland stretches, extending far up the river valleys, are survivals of an earlier and more widespread forest, but it seems unlikely that the timber was ever of good quality. The oak-pine association formerly so widespread in lowland and upland regions alike has now become more differentiated, and the oak tends more and more coastwise, while the Scots pine is limited to the hill and moorland country.

The hill-pasture zone is intermediate between the agrarian and moorland belts and shares in the life conditions of both. The heath or grass moor is distinct in character from the higher heather and sphagnum moors, and is in general typical of thinner soils and a small primary development of peat. Thus in the Wigtown moors the hill pasture has been restricted by the continuous growth of peat separating the vegetation from the influence of the subjacent rock, and its westerly aspect has thus deteriorated what would have been naturally good pasture ground. Bracken (*Pteris aquilina*), which is in general absent from the true moors, is common in this zone, and often covers the leeward or eastern slopes when heather occupies the western slopes.

In the moorland zone peat becomes at once the dominant factor, for

the plant groups are largely determined by the depth and nature of the peat covering. Cotton grass moor (*Eriophorum*), heather moor (*Calluna*), and rush moor (*Scirpus*) are the three principal types in the moorland zone. Heather occupies the peat of the lower plateaus, which is shallow and seldom ascends above 1500 feet. Cotton grass prevails on the higher plateaus up to 2000 feet, the water content of these being far larger than that of the heather moors. Between 1500 and 1750 feet both heather and cotton grass exist: the 40 inches isohyet is in the nature of a boundary between the Calluna and Eriophorum moors. The Scirpus association is seen best in the lower portions of the moorland zone, notably in areas which are badly drained, and where the tuft grass clings to the saturated peat soil. In his researches on the Southern Uplands peat, Dr. Lewis (10) has shown how the post-glacial oscillations in climate have been recorded in the hill and plain peat alike. He says that it is only in the Wigtownshire mosses that the peat is forming to-day, while elsewhere denudation of the peat is ensuing on the general drier conditions. These mosses rest in hollows in the till and between rock outcrops, and "flow" mosses are in fine preservation in a country not greatly trenched by turbaries, as the population is sparse. This preservation, Dr. Lewis suggests, was facilitated by the general level of the country restricting the drainage. The flow mosses also gave valuable evidence as to the direction of ice movement. In speaking of the lowland mosses of Wigtown, Dr. Lewis says: "All the whale-backed hills showed the same feature, a deep excavation on the NNE. filled with a growth of peat, and at the SSW. end a great accumulation of till covered by very shallow peat." (10)

There is a great difference in the sequence of the peat beds in the upland and lowland peat: the remains in the coastal mosses of both counties show that the peat was formed in shallow lakes and swamps as distinct from the hill peat, which contains few "reed" plants. This difference results in part from the variation in the glacial drift, and in part from the climatic contrast of hill and lowland. In the more exposed portions of the moorland belt, bilberry appears as the typical sub-alpine species, and is best seen on the hill tops of the Kells Ra., Cairnsmore of Carsphairn, and the Merrick group. The Alpine zone is characterised by mosses, lichens, dwarf willows, and bilberry, and in Galloway is limited to the hills around "the cauldron," *i.e.* Merrick and the three Cairnsmores.

Soil Conditions.—The influence of the soil is hardly less important in connection with natural vegetation than that of climate, and may be referred to at this point. The soil derived from the original Palaeozoic floor is a hazel loam of a light kind suited for arable or pastoral farming. The distinction between the Ordovician and Silurian soils is not great, but the subsoil of the latter is as a rule more easily ploughed and more susceptible to cultivation, the older rocks being more gritty and metamorphosed. The general dry nature of these primary soils and their small depth are both favourable to a turnip and barley husbandry,

and where not cultivated or occupied by peat moorland, the Silurian soils give fine grassland.

The granite soils are essentially of the clay type, due to the break up of the mineral felspar, and the decomposition product is an impure yellow clay, seldom cultivated. The Carboniferous rocks of the Kirkbean coast and Loch Ryan yield rich loams, largely mixed with till, however, and the Permo-Triassic sandstones of the Dumfries border yield a good grass belt, the basis of a large dairy-farming industry.

The recent soils of glacial origin have profoundly modified the economic life of the Province. Their importance has long been recognised. Chalmers in his *Caledonia*, 1824, notes that "on some of the heights the soil is more fruitful than it is in the vales below," and to this day

FIG. 4.—The Tarf Water, Wigtown Bay. Note cultivated esker in background.

this is the most striking feature in the arable zone of Galloway (Fig. 4). In the Newton-Stewart area, the Machers and the Glenkens, as well as many other areas, the turnip and oats cultivation is proceeding on the rounded gravel eskers or clay drumlins, while the low-lying flats between the mounds may be occupied by wet undrained peat bog. The boulder clay deposits undoubtedly stimulated peat growth, and the chilling effect they have in arable lands has proved a great hindrance to agriculture. The importance of the glacial features is also borne out by the place names: *e.g.* a large number of farms have names beginning with "drum": Drummore, Drummoral; and the Celtic "claugh" or "clach," that is "stone" or "boulder," is seen frequently: Auchincloich, Garclaugh. (11) The widespread distribution of the glacial drift may account for the universal use of round stone dykes in the Province, as being the most economical method of getting rid of the stones when new farmland was being opened up.

Some of the richest lands are found on the alluvium of the riverine areas, such as the "holm" lands of the Ken valley, the carse beaches of the Solway, and the Stranraer plain.

The abundance of boulder clay and the absence of a lime constituent in the Galloway soils necessitated the addition of artificial soils when agriculture developed. The first manure soil was derived from the "sea-sleech" of the shore. At a later stage shell marl was used, particularly in the coastal areas, and carted to the inland farms, and with the opening of a regular sea communication with Cumberland and Ireland lime was introduced and often lavishly applied.

The main distribution of the provincial soils is somewhat as follows :—

1. In the north and west of Kirkcudbright is the great moorland peat soil tract, including the granitic heather moors of Kells and the Fleet basin, and the grass Silurian moors of the lower hill areas down to 500 feet. In his *Agricultural Survey*, 1813, Samuel Smith distinguishes in his soil map what he terms "green mountains," including the upper Glenkens, the Carlins Cairn range, and Cairnsmore of Carsphairn. These hills are green with short grass, which contrasts remarkably with the heather and cotton-grass moors of the west, as seen for example on Cairnsmore of Dee. The difference is perhaps a climatic one rather than one of soil, and the primary distribution of peat has undoubtedly determined the character of the hill vegetation.

2. The Glenkens valley, and in particular the "holm" land between New Galloway and Dalry, has a rich loam soil with much gravel formed from the glacial drift. The drumlin country is seen at its best in the neighbourhood of Balmaclellan. The flat meadowlands are best developed on the east side of the valley, and open south by Crossmichael on to the Castle-Douglas plain. Below the junction of the Blackwater of Dee the flood plain opens on the west side, and the boulder clay soils are worked to the foot of the Loch Whinyeon hill mass.

3. The third belt is the main agricultural zone of the county, and stretches from Borgue by Kirkcudbright to Castle-Douglas, Dalbeattie, and the New Abbey coast, where it passes through the parishes of Troqueer and Terregles into the new red soil of the Dumfries basin. The belt is mainly drum and esker country, with outcrops of Silurian shales and grits forming pasture grounds.

4. The siliceous soils of the north-east give a natural grass belt.

5. The granite heather and grass moors of Bengairn-Screel and Criffel form the littoral pastoral zone.

6. The narrow fringe of Carboniferous soils of the south-east, dry and sandy in nature and liable to drought.

In Wigtown there are three main soil divisions corresponding in a large degree with the triple division suggested by the local names.

1. The unreclaimed moorland is extensive, and the general lower level of the ground and the milder climate have caused the agrarian and hill pasture zones to penetrate farther inland than in the Stewartry, so

as almost to meet the Ayrshire belts projecting southwards in the main valleys such as the Duisk-Cree. Mature systems such as the Cree and Bladnoch have strips of alluvial meadowland, and the arable drum country is intermingled with the "holm" lands.

2. The Machers peninsula has soils very similar to those of the central belt in the eastern county ; in it we may distinguish the following : (*a*) the estuarine belt on Wigtown Bay, with carse soils, mainly blue clay, cultivable when adequately drained ; (*b*) the drum and esker soils of the centre ; (*c*) the Wenlock shales of Burrow Head with little boulder-clay covering save in a few isolated hollows ; (*d*) the hill-pasture zone of the west, mainly in the parish of Mochrum, on the glaciated Silurian soils.

Early maps of the Machers show a wide distribution of "lochans" or lake-filled hollows in the boulder clay, and the numerous grass tracts in the peninsula often occupy the drained sites of these glacial lakes, the simultaneous growth of rushes and tuft grasses indicating the clay floor of the hollows. Flow-peat still occupies the undrained hollows, and the siting of farm buildings on rock outcrops above the clay is a very striking feature in the southern Machers.

3. In the Rhinns peninsula all the land save the moorland north of Portpatrick is now under cultivation. The hazelly loam soil is usual ; the Carboniferous and Permian areas are largely drift-covered. The Permian forms a rich grass belt, but the capping of boulder clay and drift sands obscures such contrast as might be expected with the Silurian soils of the adjoining areas.

The Natural Units of Galloway.—From what has been said as to the physical elements and the connection of the vegetation and soils distributions with these, it becomes evident that the Region is made up of a group of units or locality types which are based on "natural" geographical conditions.

The "natural unit" must have a distinct and peculiar character, and although a subdivision of a larger expression, it is by no means a simple one. It is not based on one single geographical element, but is itself a combination of associated factors which give it an individuality of its own. The divisions represented on the map (p. 38) are an attempt at delimiting these collective units.

Viewed structurally, the Province must be treated as a whole without reference to administrative divisions, but in determining natural units it is justifiable to utilise the two counties as entities in themselves. The units in Wigtown are the three suggested by the local names.

"The Moors" belt, the pastoral unit, forms the western portion of upper Galloway, and is continuous with the higher uplands of Minnigaff and Kells in the adjoining county.

"The Machers," by its peninsular aspect, forms a region apart, but in the west the "Moors" type of country appears in Mochrum. In general, however, the road and railway linking the towns of Newton-Stewart and Glenluce may be said to divide the hill and plain units.

Sketch-Map to show the Natural Units of Galloway.

"The Rhinns" division should, strictly speaking, be confined to the peninsula west of Stranraer, but as the economic life of the Stranraer plain is similar to that of the Rhinns proper, this may be included in the unit.

In Kirkcudbright the natural units are in no wise so evident. The Stewartry is divided for parliamentary purposes into north, east, south, and west portions, based on the lines of the parish boundaries. A combination into two groups of north-west and south-east gives expression to the geographical contrast of moorland and plain, although the divisions are never so elemental as in the Shire. The north-west group has three sections : (*a*) the High Moors of Merrick-Kells ; (*b*) the Glenkens valley ; (*c*) the Low Moors on the southern margin extending across the county from south-west to north-east.

The south-east group forms the East Galloway Lowlands and includes (*a*) the Southern Moors and coastal belt ; (*b*) the central belt—an agricultural zone with three urban centres, Dalbeattie, Castle-Douglas, and Kirkcudbright.

In both counties the economic gravitation may be said to be towards the meeting-place of the two main topographical zones of hill and plain, and the population tends to be concentrated there. The natural units are the expressions of local character, and are dependent on and controlled by this fundamental distinction of physical type. Beyond this the study of regional life must assume another form. The entrance of man on the scene introduces an altogether new set of conditions. With his power to re-create environment, man becomes, in part at least, the master of geographical event, and into the connected processes of nature, consummate in the "natural unit," he introduces elements which require a different standpoint, and open up quite another aspect of the inquiry.

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THE GEOGRAPHY OF WORLD COMMERCE: A REVIEW.[1]

By Geo. G. Chisholm, M.A., B.Sc.

The full title of this work must be regarded as merely complimentary to the memory of the author of the work originally bearing this title, the first edition of which appeared in 1867 and 1872, the second volume three years before the author's death. The claim of the editors that this is an entirely new treatment of the subject is entirely justified even when the present edition is compared with the second edition of the first, more general, volume of the original work brought out in 1877 by the author's son, Dr. Richard Andree, who contributes a preface to the first volume of the present work. This first volume was published in 1910, the second in 1912. The third has not yet been seen by the reviewer, and it is only the fourth volume that has been sent to us for review; but as the reviewer has made much use of the first two volumes, to the excellence of which he gladly bears testimony, he may be allowed here to make some reference to these also.

The fourth volume, like the others seen by the reviewer, can hardly be too warmly recommended to geographers, especially in respect of the marvellous industry shown by the authors of the different sections and the fulness of the references to authorities. Part of the explanation of the enormous amount of labour bestowed in the preparation of this work is perhaps to be found in the fact mentioned in the preface to this volume that one of the editors received a subvention from the then imperial and royal (Austro-Hungarian) ministry of worship and education, enabling him to make lengthened studies in the libraries of Vienna and Berlin, and to visit the harbours and museums of North Germany, Holland, and Belgium. But it is not he alone who deserves credit for industry. All the contributors are alike in this regard. It may also be noted as a mark of the honesty of endeavour characterising the work that no attempt is made to harmonise the views of different contributors where there is a divergence of opinion. On the contrary, we find on occasion that divergence expressly indicated.

While the previous volumes are mainly devoted to regional geography, the volume now under review is taken up with more general geographical considerations or with matters that cannot be adequately dealt with on a regional arrangement. But 258 out of 952 pages of the first volume also deal with matters of world-wide, or at least very extensive, distribution, and this has resulted in a certain amount of overlapping.

[1] *Karl Andrees Geographie des Welthandels, eine Wirtschaftsgeographische Schilderung der Erde vollständig neu bearbeitet von einer Anzahl von Fachmännern und herausgegeben von Dr. Franz Heiderich, Professor an der Hochschule für Welthandel in Wien, und Dr. Robert Sieger, Professor an der Universität in Graz. Vierter Band.* With three large folded coloured maps, besides railway maps of Africa and S. America, and one of the waterways of Central Europe, printed with the text. Vienna: L. W. Seidel und Sohn, 1921.

Thus, in the first volume there are eleven pages, in the fourth thirty-two, on the subject of climate.

The contents of the fourth volume are arranged under three main heads:—The Division of the Earth in Economic Geography, by one of the editors, Professor Sieger of Graz (129 pp.); the Geographical Distribution of the most important Commodities, by Professor Ernst Friedrich of Leipzig (288 pp.); and Communications and Commerce, which is divided into two sections, one of 37 pages, by Professor Hossinger of Graz, consisting mainly of comments on the two large isochronic charts, one relating to about the year 1812, and the other to about the year 1912, for the compilation of which he is also responsible; the other of 220 pages, by Dr. Hermann Leiter, Dozent at the High School for World Commerce and General Secretary to the Geographical Society in Vienna, who is the compiler of the third of the large maps, one showing the principal railway and sailing ship routes, the oceanic telegraph cables, and the volume of shipping at the principal ports of the world in 1912-1913. There follows a short appendix by Professor Friedrich on the Development of Industry after the War.

There is no index. A note to the table of contents states that the publishers were obliged to withhold both a list of printer's errors and an index for all four volumes, but adds that at the wish of Professor Friedrich the table of contents under the head of Commodities had been made sufficiently detailed to serve very nearly as an index. And this is true; for though we have not the advantage of the alphabetical arrangement of an index proper, this table of commodities is so well classified that it enables one to find any commodity with very little trouble—enables one also to see that the list is a very full one.

A book such as this has inevitably suffered greatly from the conditions of the period in which its preparation was going on, and all sensible readers will make due allowance for this. The whole of Professor Friedrich's long contribution—apart from a few supplementary pages—was in the press before the War. The first five sheets (pp. 1-80) were printed in 1914 and 1915, and the last to be printed, we are told, were sheets 6-8 (pp. 81-128). Advantage has been taken of these later printings to bring the work more nearly up to date. Thus the fact that sheet 8 was one of the last printed allows of the long discussion of natural regions, climate zones, etc., to be supplemented by a notice of Unstead's paper in the *Geographical Journal* for September 1916 on "A Synthetic Mode of Determining Geographical Regions"—a notice favourable to the idea but pointing out that we must wait for fuller information before it can be satisfactorily carried out.

If the industry of the authors of this volume can hardly be too much praised, the reader is nevertheless apt to be impressed at times with the sense that the book has the faults of its qualities, feeling now and then that the authors are somewhat smothered in the products of their own industry, too much oppressed with detail to give the reader a satisfying broad general view. Much of this volume accordingly makes more

difficult reading than the admirably clear exposition of the regional geography of the earlier volumes. One feels that, for example, in the long discussion just referred to of what the author of the section containing it himself describes as "an absolutely bewildering confusion of divisions" (*eine schier verwirrende Fülle von Einteilungen*), with regard to which one is compelled to recognise in the end that any one of them may be accepted as useful, and none can be regarded as final. And while under "Climate" there is perhaps too much on this aspect of the subject, one would like to have had something more than mere occasional allusions to the effect of altitude on climate, as if that were a subject clearly understood. One would like to have had, in particular, fuller consideration of the broad statement made in the first volume (pp. 39-40) that the diminution of temperature with altitude has the broad result that a difference of 1000 metres in altitude corresponds to a difference of about 2000 kilometres in latitude. How, one may ask, does this agree with a comparison of temperatures between St. Louis and Denver in the United States, Winnipeg and Banff (Alberta) in the Dominion of Canada?

It ought, nevertheless, to be added that there are many novel and interesting broad statements and generalisations scattered through the volume now under review, and it is no disadvantage that some of these give one ground to pause and think. Geographical influences are so complex that generalisation in that subject is peculiarly difficult. We are very apt, in thinking of particular circumstances, to be led astray, and express ourselves more broadly than the facts warrant. On pp. 107-8 we have a reference to a high density of population as stimulating a more intensive economic organisation and technical equipment (the view on which Achille Loria lays stress), in consequence of which we see populations crowded on a confined area urged on by the "great mistress, necessity," the dread of over-population, to make more rapid progress than is usually possible in thinly-peopled lands. No doubt that is so in some cases, and yet we must recognise that there are some densely-peopled areas in which great density of population seems to have no such action, and others in which a great stimulus to economic peoples is the result of the sparseness of the population. Think, on the one hand, of India, for example, with its dense population ("the sole great tropical agricultural region," one of the authors of this volume remarks), and North America, on the other hand, which with its vacant lands gave the opportunities which acted as a stimulus to those who came to the continent with the experience of Europe behind them.

Still, the generalisation just cited may be accepted with the necessary qualifications. A much more dubious instance is the statement (p. 507) that "[inland] waterways are all the more valuable the more productive the land traversed by them, or the more advanced its industrialisation." Can this be applied, say, to England? Two or three pages farther on we are told that for great through routes boats of from 650 to 1000 tons are the smallest that can be regarded as paying. If that is so, where

can we get through routes in England on which vessels of that capacity can be used? It is generally recognised that the through routes in that country which it would be most advantageous to establish are routes connecting the Thames, Severn, Humber, and Mersey, yet the cost of providing waterways making these connections even for 300-ton boats would be prohibitive. It is in fact impracticable to make any generalisation about inland waterways, so much depends on the nature of each individual waterway as well as upon other circumstances, which also differ greatly in individual cases. The author of this section, rightly emphasising the importance of inland water-carriage for Germany, has to point out (p. 512) that more than half of this water traffic fell in 1913 to the Rhine and its area (the great bulk of this, he might have added, to the Rhine itself and the small portion of the Main from Frankfurt downward). On this subject indeed not all the author's statements can be accepted without question. On p. 507 he tells us that in the German Empire one-fifth of the total goods traffic fell to the inland waterways. On p. 512, however, he gives the total amount of this traffic in 1913 at 99·63 million metric tons. Now the *Stat. Jahrbuch f. das Deutsche Reich* for 1920 gives 776·26 million tons as the amount carried by the railways in the same year, which makes the water-borne proportion only about $2\frac{1}{2}$ million tons more than one-eighth of the aggregate of these two.

On the whole, sound judgment seems to be shown by Professor Friedrich in his brief forecast of the development of industry after the War given in the appendix. But we do not include under this pronouncement his opening sentence which states that one of the chief causes of the War was the increasing anxiety caused to the *entente* countries by German competition. To test this idea it is not necessary to refer to either of the authorities which Professor Friedrich cites in support of it. It is no doubt possible to make out a case to that effect by quotations even from publicists in this and other Allied countries. There were possibly some stupid—very stupid—people in this country who held that the development of Germany in industry and commerce was nothing else than a blow or a threat to British trade and industry: but there is no reason to believe that the proportion of stupid people is greater in this than in any other country, even in Germany, and everything now tends to show that when we manage to get out of the present confusing state of affairs and come to see clearly the effects of the War, one of the most important results will be to enable everybody capable of thinking to reckon up the net gain, economic, moral, or whatever it may be, that the War has brought to any of the countries concerned in it, and so to sweep away all excuse for such stupidity in the future.

Naturally Professor Friedrich laments the fact that the issue of the War seems to threaten "most of all" the industries of Germany and Austria. But for recovery he relies on the dictum that "the good will find a way" (*Das Gute bricht sich Bahn*). Now there is not the slightest doubt that in the past many German commodities found their way to

foreign markets, including our own, in virtue of their high quality; but that is not inconsistent with the fact that Germans themselves have sometimes emphasised, that a large part of the German success in neutral markets was due to this, that their own large market for goods of an interior quality helped them to turn out in large quantity at an exceptionally low rate goods of a similar character for similar markets abroad.

As regards the countries of the world generally, he points out under various heads that one prominent result of the War has been to stimulate them to make every effort to make themselves less dependent on other countries than they were before. And he might have added that in this respect the War has merely done a great deal to hasten on a process which had long been going on at a slower rate, a rate so slow that it was not easy of detection. What the acceleration of this process is ultimately to mean for ourselves it is too soon to say.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

New Members.

At the meetings of Council held on 13th October, 3rd November, and 6th December, 231 new ordinary members were elected. Of this number 173 had previously been Associate members; 47 new Associate members were also elected to membership.

Honorary Membership.

In testimony of their high appreciation of the past services of Sir Colin G. Macrae, W.S., a late trustee of the Society, the Council unanimously agreed to elect him an honorary member of the Society.

Diploma of Fellowship.

The ordinary Diploma of Fellowship has been conferred on the following:—Mr. C. B. Fawcett, B.Litt., M.Sc. (Lond.), Reader in Geography, University, Leeds; Mr. C. T. Macgregor, M.A., Edinburgh.

The late Dr. W. S. Bruce.

The following Minute relating to the late Dr. W. S. Bruce was unanimously adopted at a meeting of Council held on 3rd November:—

"The Council desire to place on record the sense of the great loss which the Society has sustained in the death of Dr. William Spiers Bruce, F.R.S.E. Dr. Bruce was one of the oldest members of the Society, was a member of Council from 1907-11, and from 1917-19, and showed his interest in the Society not merely by his regular attendance at the meetings of Council when circumstances permitted, but by

frequent consultations with other leading members of the Society on matters of importance, by lectures and extensive donations to the Society, and contributions to its *Magazine*.

"The Council also desire to recognise the lustre shed not merely upon the Society but also on Scotland by the great amount of valuable scientific work done by him, more particularly in the department of Oceanography in connection with his explorations both in southern and northern seas, as well as by his exploring work in Spitsbergen, where he, together with Mr. Mathieson, made the first map of the island of Prince Charles Foreland.

"They direct the Secretary to send a copy of this Minute to his widow."

Annual Business Meeting.

The Annual Business Meeting was held on 10th November in the Society's Rooms, Edinburgh, Lord Salvesen, President, in the Chair.

The Thirty-seventh Annual Report of the Council, which appears on pp. 68-72, was then summarised by the Secretary. Following the adoption of the Annual Report, it was decided on the motion of Mr. H. M. Cadell, Chairman of Council, to send a message of sympathy to the widow of the late Dr. W. S. Bruce. Dr. Bruce, the Chairman said, was an eminent man of science, and had been well known in Edinburgh circles for many years. Some of them may have thought that he had not received the recognition to which he was entitled in the scientific and exploring world, but as far as the Society was concerned they all felt his loss keenly.

Mr. John Mathieson, F.R.S.G.S., was elected Honorary Librarian and Map Curator, and Mr. T. B. Whitson, C.A., was elected Treasurer in succession to Mr. David Callander, C.A., who has retired. The other honorary office-bearers were re-elected.

The following members of Council who retire by rotation were re-elected :—Professor J. Y. Simpson, D.Sc., F.R.S.E. ; W. B. Blaikie, LL.D., F.R.S.E. ; Harry R. G. Inglis, F.R.S.G.S. ; R. T. Skinner, M.A., F.R.S.E. ; W. L. Calderwood, F.R.S.E. ; Professor T. Hudson Beare, B.A., B.Sc. ; W. B. Wilson, W.S. ; Professor T. J. Jehu, M.A., M.D., F.R.S.E. ; and Major Livingstone Bruce, M.C. Vacancies in the Council were filled by the election of J. Hamilton Birrell, M.A., F.R.S.G.S. ; the Right Hon. Lord Cassillis, J.P., D.L. ; William Lindsay, F.R.S.G.S. ; Sir W. Leslie Mackenzie, M.A., LL.D., M.D. ; R. Cockburn Miller, C.A. ; Harold Raeburn, F.R.G.S.

The following are the members of Council elected or re-elected at the outlying centres :—Glasgow, A. Stevens, M.A., B.Sc. ; Dundee, William Mackenzie ; Aberdeen, John Clarke and Professor J. B. Baillie.

A. E. Maylard, M.B., B.Sc., F.R.S.E. ; J. C. Buist ; and the Very Rev. Sir George Adam Smith, D.D., LL.D., were re-elected Chairmen of the Glasgow, Dundee, and Aberdeen centres respectively.

OBITUARY

W. S. Bruce, LL.D.

Scotland has lost her foremost polar explorer and oceanographer by the death of Dr. W. S. Bruce, which we regret to record occurred in Edinburgh on October 28, 1921. Not only did Bruce hold a remarkable record in the number of polar expeditions he had led or accompanied during the last thirty years, but he was also acknowledged to be the highest authority on polar exploration of his time. It was only his intense dislike of publicity and his natural shyness that prevented him becoming one of the outstanding personalities of his generation. In 1892, at the age of twenty-five, he abandoned his medical studies in Edinburgh to join the expedition of the Dundee whalers to the Antarctic, sailing as surgeon in the *Balaena* with his friend, Mr. W. G. Burn Murdoch. Although short in duration and limited in opportunity, this expedition, through Bruce's energy, had important results, among which a fine set of meteorological observations, taken under great difficulties, was the most complete Antarctic series up to that date, and clearly indicated the probability of the Antarctic anticyclone. The following year Bruce planned an expedition to explore South Georgia. The Government of the Falkland Islands was keenly interested, but the modest £400 required could not be found. A chance to join a whaling cruise to the Ross Sea also failed because Bruce could not reach Melbourne before the sailing of the *Antarctic*. After some experience in the *Challenger* office and a year in charge of the observatory on the summit of Ben Nevis—since closed in 1904 by a parsimonious Government—Bruce sailed in the *Windward* for Franz Josef Land, and in 1896-97 was engaged with Mr. F. G. Jackson in survey work. He was present at the historic meeting with Nansen.

The following year Major Andrew Coats invited Bruce to accompany him in his yacht *Blencathra* for an oceanographical cruise to the Barents Sea, Novaya Zemlya, and the Wiche Islands. On his return to Tromsø, Bruce sailed north with the Prince of Monaco, who was bound for Bear Island and Spitsbergen in the *Princesse Alice*. An important landing was made on Hope Island (*cf.* this *Magazine*, March 1899). This voyage was in the nature of a reconnaissance for the next year's cruise, which Bruce again accompanied, taking part in oceanographical work off the coasts of Spitsbergen and the detailed hydrographical survey of Red Bay (*cf.* this *Magazine*, September 1900).

On his return from the *Balaena* expedition Bruce had at once begun to reawaken interest in the Antarctic, in which he was supported by Dr. (later Sir) John Murray, Dr. H. R. Mill, and others. The story of his organisation of the Scottish National Antarctic Expedition is the record of dauntless perseverance and tireless enthusiasm in the face of great difficulties. The plans, first published in 1900 (*cf.* this *Magazine*,

June 1900 and November 1901), eventually materialised, the necessary funds being raised by public subscription in Scotland, aided by encouragement of this Society. The two chief subscribers were Mr. James Coats, Junior, and Major Andrew Coats. The *Scotia* sailed in 1902 for the Weddell Sea, Bruce having selected a sphere of work between the Swedish expedition to the west and the German expedition to the east. Two summers were spent in the Weddell Sea and one winter at the South Orkneys. Vast areas of uncharted ocean were hydrographically surveyed, the "Ross deep" was obliterated from the map, 2660 fathoms replacing Ross's 4000 fathoms, no bottom, and a new section of the coast-line of Antarctica, Coats' Land, was discovered in lat. 72° 25′ S., long. 17° 27′ W., and traced for 150 miles to the south-west. On the return voyage oceanographical survey was continued northward more or less on the meridian of long. 10° W., and a long southern extension of the mid-Atlantic ridge was found. A landing was made on Gough Island. The *Scotia* obtained extensive biological collections, down to depths of 3000 fathoms, which in variety and extent have probably never been equalled except by the *Challenger*. This strikingly successful expedition cost only some £35,000. The Meteorological Observatory (Omond House) founded at Scotia Bay, South Orkneys, was taken over, and has been since maintained, by the Argentine Government. The preliminary reports of the *Scotia* expedition appeared in this *Magazine* (February and March 1904; January and August 1905). Bruce proposed a second expedition in 1910, which included the first suggestion of a traverse of Antarctica from Coats' Land to the Ross Sea, but the funds did not reach the requisite amount for a start to be made.

Bruce returned to his Spitsbergen explorations in 1906, devoting his attention in that year, 1907, and 1909 to Prince Charles Foreland which, with the help of various assistants, he mapped on a large scale (*cf.* this *Magazine*, March 1907, and Map, on scale of 1 : 140,000, published by the Prince of Monaco, 1913). Bruce's work in Spitsbergen, which was continued in visits in 1912, 1914, 1919, and 1920, touched most parts of the archipelago. He took many soundings on the west coast and in Stor Fjord, and devoted much attention to the natural history and the economic development of the country. He was a strenuous advocate of British sovereignty in Spitsbergen in view of its strategic and economic importance. Bruce's knowledge of the navigation of Spitsbergen coasts and waters was extraordinarily wide and detailed and fully equal to that of Norwegian pilots.

One of Bruce's great ambitions was to see an Oceanographical Institute in Edinburgh. In his Scottish Oceanographical Laboratory, opened by the Prince of Monaco in 1907, he made a beginning. For twelve years it functioned as a centre of polar research and, with its store of oceanographical apparatus, helped to equip several expeditions. But the burden of its upkeep fell entirely on Bruce's shoulders, and when his strength failed in 1920 he had to disperse his laboratory. The library is now in the University of Edinburgh, the rich collections

in the Royal Scottish Museum, and the maps in this Society's rooms. It should be recorded that on his return from the Antarctic in 1904 Bruce offered the *Scotia* to the Scottish Universities for training students in oceanography and biology, but his offer was refused. Another project of Bruce's at which he worked for years was that of a zoological garden and aquarium in Edinburgh. The success of the Scottish Zoological Park, of which he was one of the founders, is now assured. Among Bruce's other activities was a period (1914-15) in charge of a whaling station in the Seychelles, but he never found tropical climates congenial. For a time he was lecturer in geography in the Heriot-Watt College, and in 1919 delivered the Thomson Lectures in Aberdeen. His work was recognised by the gold medals awarded him by this Society (1904), the Royal Geographical Society (1910), the Royal Society of Edinburgh (1911), and the American Geographical Society (1920). In 1907 the University of Aberdeen made him an honorary LL.D., and he was nominated by the Prince of Monaco a member of the international committee of the Oceanographical Institute, Paris. He was an honorary fellow of the New Zealand Institute and the Berlin Geographical Society and for many years a member of the Council of this Society.

Besides editing the *Scotia* results, Bruce wrote *Polar Exploration* (1911) and "Falkland Islands and Dependencies" in the *Oxford Survey of the British Empire* (1914). Latterly he made much patient research into the early history of sealers around Graham Land, some of which was published in "The Weddell Sea: an historical retrospect" (*cf.* this *Magazine*, June 1917); in the Report of the Committee on the Development of the Falkland Islands Dependencies, 1920; and in the new Antarctic Sailing Directions. He had intended, when time permitted, to write a general account of his polar voyages, but that is now left for others to do as his memorial. His life was packed with adventures, but until his scientific work was done he would not give the time to recount them.

By his untimely death polar exploration has lost an ardent advocate and leader, and science a devoted worker, while his many friends are the poorer because a true, generous, and unselfish man has gone from among us. To the end polar exploration occupied his thoughts. In his will, written a few months ago, he directed that after cremation his ashes were, if possible, to be scattered on the Southern Ocean between long. 10° and 15° E. in a high southern latitude where oceanographical work is much needed. It is hoped to carry out at least the spirit of his wishes.

R. N. R. B.

GEOGRAPHICAL NOTES.

EUROPE.

The Drought in 1921. A short note in the *Annales de Géographie* for September 15 last gives a brief summary of the facts then available in regard to the drought which prevailed over much of Europe during

the first half of the year 1921. Apart from Russia, as to which details are not yet obtainable, deficiency of rainfall occurred in Britain, throughout the whole of France, in the Low Countries, in Western Germany, and in Switzerland. In France the maximum deficit was observed in the Paris Basin. In the first six months of the year it measured 60 per cent. of the normal fall: at Nantes the figure was 38 per cent., and at Dunkerque and Bordeaux 42 per cent. A deficiency of rain had already begun to make itself felt by the end of 1920, and in France the rivers were low even during the winter months, before the drought became severe. The result was to impede seriously inland navigation, alike on rivers and canals. The Canal de l'Est, the Burgundy Canal, and that connecting the Rhine and the Rhone were all affected. The rains of August left the situation in France precarious, many wells being still dry. On the whole the year 1921 would appear, in Europe generally, to be one of the driest known.

The New Yugoslav State.—In recent issues of the *Annales de Géographie* there have been published valuable articles on some of the new states of Central Europe. Mention may be made especially of one on the new Rumania, by Professor de Martonne, in the issue for January 15, 1921, and one on Yugoslavia in that for March 15. In both cases the mass of detail renders it impossible to make an abstract in the ordinary sense, but one or two general points brought out in the latter article may be mentioned.

Its author, M. Yves Chataigneau, points out that Yugoslavia differs alike from enlarged Rumania and from Czecho-Slovakia in the comparatively small number of aliens included in the new boundaries. Though exact figures are difficult to obtain, he believes that less than ten per cent. of the population is non-Slav. Perhaps more important than this inclusion of a small proportion of other elements is the fact that many Slovenes, a group peculiarly difficult to assimilate, remain outside the frontier.

On the other hand, M. Chataigneau admits that unity among the Slavs themselves has been in the past, and is still to some extent at least, rendered difficult, first by the differences of religion, and second by the historical separation between the various groups. The Slovenes, the Serbo-Croats of Croatia, and the Serbs of the kingdom have not only been included hitherto in different political units, but their political and social development has proceeded along divergent lines. Putting the matter in epigrammatic form, the author says that before the War Serbia was the Piedmont of the Slav renaissance, always ready to fight, while the Croats bargained, and the Slovenes, divided among various provinces, and with little political power, occupied themselves with making the best of existing conditions. The resultant absorption of the last-named in their local interests has given them a tendency to oppose the central power which may give rise to difficulties under the new régime.

So far as natural resources go, the new state is favourably placed, and should be able to export both foodstuffs and minerals. The industry—as yet small—of the Croats and Slovenes will find a market within the country, but will not meantime be able to satisfy the needs of that market. Manufactured goods must therefore be imported, and the tendency is to sell in countries where the exchange is relatively high, as in Britain and France, and buy where it is low, as in Germany, Austria, Czecho-Slovakia, and so on. But the great weakness of Yugoslavia is the absence of an adequate seaport within its own frontiers. Trieste, Fiume, and Salonika have all been lost politically, and the power to utilise all three adequately will depend upon treaty arrangements. M. Chataigneau is not among those who consider that a new large port can be easily constructed by Yugoslavia on the Dalmatian coast. The harbours of that coast are, he says, very useful for coastal trade from point to point, but the inhospitable hills and plateaux behind will prevent them from acquiring importance as exits for the products of the interior.

General.

Obituary: Dr. Julius Hann.—All those who take any interest in either climatology or meteorology will learn with much regret of the death of Dr. Julius Hann, the *doyen* of the two sciences, whose two great books, *Handbuch der Klimatologie* and *Lehrbuch der Meteorologie*, had become classics in his own lifetime. Dr. Hann, who died in October last, was born near Linz, Austria, in 1839, but spent almost the whole of his working life in Vienna. He kept up his scientific interests to the last, but it is tragic to learn that in his last years he suffered great privations, owing to the economic collapse in Vienna. In the issue of *Nature* for October 20 last Sir Napier Shaw gives an eloquent and feeling summary of his life work; but his books will remain his greatest monument.

International Geological Congress.—The Thirteenth International Geological Congress is to be held at Brussels, from August 10 to August 19 this year, and a preliminary circular of invitation has been issued, of which a copy has been sent to us. The president is to be M. J. Lebacqz, Brussels, and the Secretariat may be addressed at the Service Geologique de Belgique, Palais du Cinquantenaire, Brussels. The official language of the Congress is to be French, but papers may be presented in English. A long series of excursions has been arranged, which fall into three groups, those which take place before the opening of the Congress, from August 1 to 9, those during its sessions, which are mostly short and limited to areas near at hand, and those for the period between August 21 and September 3. A preliminary list of subjects upon which papers are to be read is also given. Further details are to be published during the month of February.

Science and Economic Conditions in Austria.—We have received from Miss Eleonora Iredale, organising secretary of the Universities' Committee of the Imperial War Relief Fund, Fishmongers' Hall, London Bridge, E.C.4, a moving appeal for help for the professors and lecturers in the Austrian Universities. It is stated that from the Armistice to the end of 1920 one-tenth of the professors and lecturers in that country died, largely as a result of want, starvation, and consequent disease; for the economic collapse has borne, in Austria as elsewhere, most hardly upon those with small fixed incomes. Among those who are mentioned as finding great difficulty in carrying on their work are many whose names are world-known. The appeal is supported by a number of distinguished University men in this country, and the aim of the Committee is to aid men of science and letters in Russia as well as in Austria.

An Edinburgh Forestry Journal.—We have received a copy of the second issue of *Sylva*, an annual magazine published by the Edinburgh University Forestry Society, with the double object of promoting scientific forestry, and keeping in touch with Edinburgh-trained foresters who are working in widely-scattered parts of the world. The issue contains some articles dealing with subjects connected with forestry, and also notes from old students in Nigeria, India, and elsewhere, as well as other material.

Notice to Members.—The Society's stock of the issues of the *Scottish Geographical Magazine* for April 1920 and October 1920 is very low. It would be a great favour if members who do not bind their copies, or who have surplus copies, would return these parts to the Library.

EDUCATIONAL.

Gilchrist Studentship in Geography.—We are informed that the Gilchrist Trustees are again offering a studentship in Geography, for the period 1922-23. Applicants, who must be teachers with at least two years' experience, should send in their names to Professor Lyde, University College, Gower Street, London, W.C.1, before the end of January 1922. The application, which should give references and a full account of previous work, should be accompanied by three testimonials. The grant, formerly £80, may be increased somewhat, but in any case will not exceed £120.

NEW BOOKS.

EUROPE.

Germany. By S. Baring-Gould, M.A. With the collaboration of Arthur Gilman, M.A. Revised and enlarged by Joseph M'Cabe. With Maps and Illustrations. London: T. Fisher Unwin, 1921. *Price* 12*s.* 6*d.*

This is a new edition of the late Mr. Baring-Gould's book, first published in 1887. It does not appear to have been much altered, save that some pages have been added bringing the history of the country down to 1914. The book is described in the preface as "still one of the most fascinating sketches of the development of Germany that the general reader can peruse," but this perhaps scarcely makes sufficient allowance for the fact that the "general reader" is not now quite so unsophisticated as he was in 1887. The brief account of the French Revolution, headed "An Upturning in France," seems, for example, hardly adequate in a book bearing the imprint 1921.

There is an index but no bibliography.

Europe—Whither bound? (Quo vadis Europa?) Being Letters of Travel from the Capitals of Europe in the year 1921. By Stephen Graham, Author of "The Challenge of the Dead." London: Thornton Butterworth, Ltd., 1921. *Price* 10*s.* 6*d. net.*

Mr. Graham's post-war method is a great improvement in our opinion on that which he followed before the War. The vague dreaminess has gone, and a quality of decision now distinguishes his style. He still manages to be extremely interesting, but he sticks more closely than before to fact. His account of a visit to several European capitals is on the whole profoundly pessimistic in tone, but if Mr. Graham who has seen can give us small grounds for hope, how can we who have not seen find them? One thing we must say. Mr. Graham is not very cheerful about London, but he is rather apt to overemphasise London's importance. "The provinces" have a way of thinking for themselves, not to speak of Scotland.

The Economic Development of France and Germany, 1815-1914. By J. H. Clapham, Litt. D. Cambridge University Press, 1921.

Every page of this scholarly work bears ample evidence of the wide learning, careful research, and sound judgment which its author has brought to the accomplishment of his task, and the result is the best survey which we possess in English of the economic development of France and Germany in the nineteenth century. Dr. Clapham's outlook is of course that of the historian and economist, but much of what he says will prove of value to geographers, for, unlike many other historians whom we know, Dr. Clapham almost always writes with his eye on the geographical background. Indeed, our only regret is that he does not do so constantly, as everything which he does say on the influence of geographical environment is worth serious consideration. In his first chapters he gives an admirable account of the conditions of French agriculture at the end of the eighteenth century—an account which reminds us vividly of the condition of things in Scotland before it began, like France at a later date, to borrow from England—and in it he shows us very clearly how these conditions varied in the different geographical regions into which the country may be divided. The state of agriculture in Germany is similarly de-

scribed with due appreciation of the geographical and ethnical differences which exist between east and west and between north and south. But he does not make quite plain to us why it was that the open field system of cultivation which prevailed over a great part of these countries differed so much from that followed in western and northern Belgium, in Holland and in the marshy valley of the Ems. To what extent was the high state of agriculture in the latter region the result of the special conditions of soil and climate which were its characteristic features?

Again, on reading his chapters on the development of manufacturing industries in France and Germany we cannot but wish that Dr. Clapham had said a little more about the causes which led to the localisation of some of these industries in certain districts. The cotton industry, for example, in both countries is more widely distributed than it is in England, and the reasons for the actual distribution are not always obvious. It is probable that an explanation is to be found in the fact that as no single region either in France or Germany possessed in so intense a degree the geographical advantages of Lancashire, the industry frequently owed more to considerations of an economic nature. In the Vosges it was aided not only by water-power, but by the large agricultural population upon which it could draw for a supply of labour; in Germany, apart from the coalfields, it depended partly upon local supplies of capital and labour and partly upon the influence of the separate economic life of the component states of the Empire to which Dr. Clapham alludes.

There are so many excellent things in this book that even a bare enumeration of them is impossible. But next to the chapters on agriculture, which appear to us to be of special value, geographers will probably find most to interest them in those dealing with transport. On the relative merits of railways and waterways the author does not commit himself, but he appears to suggest that the advantage of the latter may be easily overrated. In his epilogue Dr. Clapham contrasts the position of the working man in 1815 and 1914, and concludes that during the great peace of the nineteenth century he had made solid economic gains which were not seriously threatened at the time when war broke out. J. M'F.

A Picture of Modern Spain, Men, and Music. By J. B. Trend. London: Constable and Co., Ltd., 1921. *Price* 15*s.*

After informing us that "the Intellectuals" in Spain were, during the War, "pro-Ally almost without exception," the author describes the present system of Education in Spain. He condemns the clerical influence, so largely responsible for the instruction provided in Spanish schools, as being "thin and superficial to the last degree." Both thinking and working men detest the Jesuit schools called *Escolapios.* The two *Residencias* near Madrid for male and female students are highly commended by the author, who adds: "Culture is not widespread in Spain as in some other countries, but those who are interested in it are tremendously keen and their education is not in the least superficial." He then gives a sketch of modern Spanish literature, and refers to the "work of Benito Perez Galdos, the great novelist, who died in the beginning of 1920, and who did more than any other writer to make Spanish a language in which there is plenty of modern fiction worth reading." He was above everything a patriotic Spaniard.

The author points out that there are three languages spoken in Spain—Basque, Catalan, and Castilian, each of which has a number of recognised dialects. Among men of letters the Basque language has a small but enthusiastic following. Catalan and Castilian are both neo-Latin languages. Castilian is low Latin. According to most philologists Catalan belongs to the Provençal family of neo-

Latin languages. "The revival of Catalan as a literary language, the effort to keep it pure and to teach people to speak it properly, is one of the most interesting movements of modern Spain. It is as different from Castilian as French from Italian, and is spoken by about five million people, many of whom can speak Castilian too. "An autonomous Catalan state, with sovereign power in internal affairs," has been demanded by the Catalan people, and their chief city, Barcelona, has been frequently the scene of revolutionary conflicts. The author adds that "the Catalan question is mainly, if not entirely, a question of economics," and "Spaniards have no need of unscrupulous propagandists from England or France to help them to settle their contemporary disputes." He appends a valuable bibliographical guide to the "Catalan Question," and to secular Spanish Music.

Germany as it is To-day. By ALAN LETHBRIDGE. London: Eveleigh Nash Co., 1921. *Price 8s. 6d. net.*

The author of this book is a journalist who was educated in Germany, and has recently paid a visit to the country, when he travelled about for a couple of months, accompanied by a German secretary. His travels included the British and French Occupied Areas, and the towns of Munich, Leipzig, Dresden, Frankfort, and Berlin. He also visited Upper Silesia, and devotes a chapter to the problem presented there. The book appears to have been somewhat hurriedly written, and its chief interest lies in its picture of post-war Germany as presented by one obviously very susceptible to suggestion.

ASIA.

The Home of Fadeless Splendour: or, Palestine of To-Day. By GEORGE NAPIER WHITTINGHAM. London: Hutchinson and Co. [No date.] *Price 24s.*

This is a book which is beautifully produced, and carefully and interestingly written. The outstanding feature in production is the series of coloured plates and etchings, the former by Stanley Inchbold and the latter by B. C. Boulter, who is also responsible for some sketch-maps. The actual "Home of Fadeless Splendour" to which Mr. Whittingham's book more especially refers would seem to be the city of Jerusalem, of which, with its history, inhabitants, and Holy Places, there is a full and reverent account, from the point of view of a post-war visitor. But nearly one-third of the whole volume is devoted to the other Palestinian scenes of particular interest to the European or American reader—Galilee, Bethany, Bethlehem—and rightly so, for they are a necessary complement to the picture of which Jerusalem is the foreground. The beliefs and customs of Christians, Jews, and Islam are all adequately dealt with.

A Handbook of Syria (including Palestine). Prepared by the Geographical Section of the Naval Intelligence Division, Naval Staff, Admiralty.

It is gratifying to find that the Admiralty has decided to make available to the general public some of the more important works prepared during the War by the Geographical Section of the Naval Intelligence Division. Many of these were written by scholars with an intimate knowledge of the regions with which they dealt, and are therefore of special value to students of geography. The work before us covers a wider area than Sir George Adam Smith's *Historical Geography of the Holy Land*, and although it does not show the same grasp of geographical principles as that learned work, it gives evidence on almost every page of an expert knowledge of the subject under discussion. The first part of the book is devoted

to a general survey of the whole region, and includes chapters on physical features, climate, economic conditions, and the distribution of the population. Of these the most important is perhaps that on climate, as it contains a number of tables giving data for temperature, rainfall, and other meteorological phenomena. The remainder of the book deals with the various natural regions into which the whole area appears to fall, and each of these regions is treated on the same lines but in much fuller detail. In a work primarily designed for military purposes a considerable amount of attention is naturally given to the physical features of the land and to questions of water supply, but the economic activities of each region and the distribution of its population are always adequately treated. The book ought to prove of special value to all interested in the politics of the Near East at the present time.

Around the Shores of Asia. By Mary A. Poynter. London: George Allen and Unwin, Ltd., 1921. *Price* 16*s. net.*

In her sub-title Mrs. Poynter calls her book "An Account of Travel in many Lands from Constantinople to San Francisco." Mr. Poynter, in an explanatory preface, tells the reader that "our travels did not take us far from the beaten track," and "what we saw has been described before and there is no attempt to 'instruct.'" But the volume needs no apology. Mrs. Poynter undertook the pleasant task of recording her impressions of many places better known to most of us by name than by visit. The book is in diary form (December 30, 1913-May 25, 1914) and treats in most readable manner the little happenings of such a journey while it reflects upon them. The writer never strives for effect, with the result that she frequently achieves it, notably in her account of Benares. The volume is delightfully simple in style, and yet educative from its first-hand acquaintance with the various places visited. It is no guide-book and thus avoids the merely hackneyed phrases of description: on the other hand, we can visualise from her account the life that Mrs. Poynter so freshly describes and feel a more human interest in these places which for so many of us begin and end as "Calcutta on the Hugli." Of the eight photographs that illustrate the diary perhaps the one entitled "Coaling Ship at Nagasaki" is most novel and instructive.

The Pilgrim in Jerusalem. By the Rev. O. H. Parry, M.A. With Maps and Plans and 24 Illustrations by the Author. London: Society for Promoting Christian Knowledge, 1920. Pp. 135. *Price* 10*s. net.*

Mr. Parry's book is the outcome of the months he spent in Jerusalem as a Chaplain to the Forces. He combines precision with attractiveness in style, and his information is as detailed as the general reader can wish. At the same time he does not burden it with quotations—the only one of length is from Mark Twain—and his bibliography makes a not too formidable list. He may be commended too for his firm and sympathetic handling of the many and strange problems which are presented by the history and identification of the Holy Places.

One of the chief impressions that one derives from the book is the enormous amount of exploration still to be done. The most promising locality is perhaps near the Eastern Wall where Sir Charles Warren made his notable discoveries in 1868, but the accumulations of debris have so completely altered the contour of the city that fresh objectives must present themselves as the work proceeds. The possibilities latent are incalculable.

The black-and-white sketches in the book are more effective in reproducing details than in the wider views of the city and its surrounding hills. The maps will be in constant use by the reader.

AFRICA.

Manual of Portuguese East Africa. Compiled by the Geographical Section of the Naval Intelligence Division, Naval Staff, Admiralty.

Every one who has attempted to acquire some knowledge of the geographical and economic conditions of the Portuguese possessions in Africa will appreciate the interest which has been bestowed upon the production of this book and the skill with which the scanty and often unreliable material upon which it is based has been utilised. The result is to present not only the best general account of Portuguese East Africa with which we are acquainted, but one in which the geographical factor is constantly kept in view. There is a careful description of the physical structure of the country, its climate and vegetation, and an adequate, if not comprehensive, account of the native tribes by which it is inhabited. This is followed by an exhaustive investigation of the conditions, geographical and otherwise, affecting the economic development of the region at the present time, while a concluding chapter summarises the conclusions, political and economic, which have been reached. It is pointed out that Portuguese East Africa "must be regarded as a colony which is only now recovering from a long period of inefficient government, although that recovery is now definite and progressive." The progress which has been made is due in part to external collaboration, both European and Asiatic, and in part to the fact that Portugal realised the dangers which would have threatened her sovereignty if her dominions had become an obstacle to the general development of South Africa. As she provides a gateway to the British territories in the interior, it has become necessary for her to keep abreast of their requirements.

AMERICA.

Seeing Pennsylvania. By JOHN T. FARIS, Member of the Historical Society of Pennsylvania, etc. With Frontispiece in Colour, 113 Doubletones and 2 Maps. Pp. 350. J. B. Lippincott Company, Philadelphia and London. *Price* 21*s. net.*

The reader is meant to "see" Pennsylvania in a special sense; it is the "fourth dimension" of time rather than the three dimensions of space which predominates. There is more history than geography in the book, and where it does occur the latter is ancillary to the former. The result is a volume intensely interesting to those who already know the story of the State in some detail, but apt to become too fragmentary to build up any unified impression on the minds of others. Not that the writer undervalues geography; on the contrary, his first chapter is headed "Look at the Map!" But by some strange freak of fortune it is almost useless to look at either of the two maps contained in the book. The first, a photo-relief map of the State, attempts so much detail that it explains nothing; the second is so much reduced that many of the names remain illegible even when a magnifying glass is used. And yet the book, arranged into distinct routes as it is, simply invites and calls out for appropriate maps on a suitable scale.

In Old Pennsylvania Towns. By ANNE HOLLINGSWORTH WHARTON. With 39 Illustrations. 352 pages. J. B. Lippincott Company, Philadelphia and London. *Price* 21*s. net.*

"Old" is, of course, a relative term, and in this work may be taken as including anything previous to last century. The aim of the writer is mainly historical; at any rate there is not a single map of either city or route included in the volume.

"Historical" is perhaps too serious a word ; much that is recorded is of no historical significance, though interesting as local records and traditions. The book represents a large amount of patient work, evidently performed in the right spirit, and will doubtless make a strong appeal to citizens of the State.

POLAR.

South with Scott. By Captain E. R. G. R. Evans, C.B., D.S.O., R.N. London : W. Collins Sons and Co., Ltd., 1921. *Price* 10*s.* 6*d. net.*

The story of Captain Scott's last expedition, his great achievement, and his immortal end, is told again in this book by Captain Evans, who was second in command of the expedition. The author's aim has been to write more particularly for Britain's younger generations with the object of keeping alive the interest of English-speaking people in the story of Scott and his companions. The epic of Scott, Wilson, Oates, Bowers, and seaman Evans is part of the heritage of the nation, but nevertheless we are grateful to Captain Evans for this simple and straightforward retelling of the tale. Of all men he was best qualified to do so, for he was in charge of the last supporting party, and turned back only 146 miles from the South Pole, narrowly escaping with his life owing to an attack of scurvy. The book is short, but that makes the story all the more vivid, and there is a delightful lack of diffuseness and absence of padding. Although the scientific results are not discussed, there is clear appreciation of their value. The adventures of the northern party under Lieut. Campbell are briefly recounted. There are a number of useful maps but no illustrations. It is a book that makes a direct appeal to young and old alike.

The Great White South. By H. G. Ponting. Illustrations. London : Duckworth and Co., 1921. *Price* 30*s. net.*

Mr. Ponting accompanied Captain Scott's expedition in 1910 as official photographer, and returned home at the end of the first year. His experiences did not take him far afield, practically all his stay in the Antarctic being at Cape Evans and vicinity. He has little to say that has not been told in other books on the expedition, and many parts of the volume would not have lost by curtailment. The final chapter is a summary of the great journey to the Pole condensed from *Scott's Last Expedition.* The chief merit of the book lies in the illustrations, which are both numerous and good. They include two frontispieces of the author ! There is no index.

GENERAL.

The Heart of Nature : or, The Quest of Natural Beauty. By Sir Francis Younghusband, K.C.S.I., K.C.I.E., President of the Royal Geographical Society. London : John Murray, 1921. 12*s. net.*

This book is in great part a plea for making more of Natural Beauty, and it commands our sympathy. The æsthetic emotion is not far away from what is best in us—a unique body-and-mind delight that never cloys. That it can be starved is obvious; that it can be developed is the happy experience of many. Pleasant emotions make for bodily and mental health : beautiful pictures garrison the citadel of life. A few men, like Wordsworth, have known this in a supreme way ; Sir Francis Younghusband's gospel is that the fountain of Natural Beauty is open to all who can get near Wild Nature anywhere. He pictures the Sikkim Himalaya, the forests and their multitudinous fauna, the high solitudes, the Tibetan sunsets, but he comes

back to the beauty that crowds us at our doors, unless these are pathologically urban. Feed the senses, enjoy the routine of the days and seasons, fill the picture-gallery of the mind with the beautiful, he advises, and the cult will grow. It will become part of the religion. For beauty is a revelation of the Spirit of Nature, not a casual efflorescence which happens to please us. Here the author is at one with many philosophers who have discussed the significance of Natural Beauty. There are, of course, physiological, perceptual, and conceptual factors in full-blooded æsthetic emotion, and we do not all enjoy to the same depth and height: but the author's plea is reasonable—that we should discipline ourselves in enjoying the beautiful, for it is one of the pathways to reality. There is easy beauty in Nature and there is difficult beauty, and every man must be sincere as his own artist. Yet it is possible to pass from enjoying simple beauty to enjoying difficult beauty, and this enriches our being. In Nature itself the evolution of beauty is going on.

Neither Scots nor Englishmen are fond of talking about the beautiful. A love of the country is almost as widespread as a love for our own country, but we do not speak about either. It is almost like speaking about our love for our mother. And it is awful to think of school-lessons in æsthetic appreciation! Only indirectly can we open the eyes of the blind.

But we must not allow our reserve to prejudice us against the enthusiasm of Sir Francis Younghusband's book. There is a time to keep silence, but there is also a time to speak, and the author has spoken with a glowing heart. He has found great treasure, and he would call his friends and neighbours together to rejoice with him. We accept his invitation gratefully. J. A. T.

Battlefields of the World-War. By Douglas W. Johnson. American Geographical Society, Research Series No. 3. New York, and London: Oxford University Press, 1921.

Warfare is more insistent than any other of the arts of man in demanding a proper understanding of regional geography. The experience of the late War has only served to demonstrate this more clearly than ever. For, while in ordinary life the progress of invention has tended to overcome obstacles of nature and reduce distances of space, so that both of these are sometimes almost forgotten, the effect on modern warfare has been the reverse. With the devastating nature of present-day attacking methods and the consequent passing of fixed fortifications, the defender has been driven to make every use that ingenuity can devise of the ground, along with what is above and below it.

Professor Johnson has rendered a valuable service both to the military student and to all interested in geography by demonstrating how necessary it is to interpret the incidents of the War in the light of local knowledge. He gives us a very comprehensive and lucid account of the chief operations on the Western and Southern fronts combined with an excellent scientific study of the *terrain*. He is fortunate in having had access to the official documents of the Allied Armies through his post on the American Staff, and in this way the perspective of his account gains rather than loses by his not writing as an eye-witness. With regard to descriptions of the ground, however, he writes largely from personal observation, and he furthermore gives numerous illustrations and maps. Starting from Flanders in 1914, the vivid narrative takes us to the chief battlefields of the French, British, Belgian, American, and Italian fronts. The book closes with two interesting chapters on the Balkans.

With regard to the Western front, Professor Johnson does not lay as much emphasis as perhaps he might have done on the effect of tanks in the last stages of the fighting. The limitations which governed the use of these deadly weapons

undoubtedly played a dominating part in deciding what were suitable grounds for attack and defence. Similarly the difficult transport problems so closely associated with the successful carrying on of the War in every field have interesting geographical aspects. Taking the book as a whole, however, we cannot but admire the skilful sense of balance with which the author has treated a large and difficult task. Being, as we understood it, the only work of its particular scope, it should be assured a definite place in the bibliography of the War.

I. B.

The Statesman's Year-Book, 1921. Edited by Sir John Scott Keltie and M. Epstein. London: Macmillan and Co., Ltd., 1921. *Price* 20*s. net.*

This year's issue of *The Statesman's Year-Book* keeps well in touch with old and new countries alike. Preserving the arrangement of matter to which we are accustomed, the editors have brought statistical and other information up to date. The new states of Eastern Europe that now appear to have consolidated themselves politically are given a place in the alphabetical list of countries instead of being treated as formerly under Russia. The appearance of new trade returns for most countries points to a settling-down to something approaching pre-war conditions. Finland's new northern outlet and the Slesvig boundary adjustment are shown in Messrs. Bartholomew's inset maps. New census returns have been incorporated so far as they were available. Altogether, the editors have maintained the high standard they undoubtedly set before themselves, and for the business man and the student, no less than for the statesman, the annual issue is practically indispensable.

EDUCATIONAL.

Cambridge Geographical Readers. IV. *Western Europe and the Mediterranean Region.* Cambridge: University Press, 1921. *Price* 4*s.* 6*d.*

This volume belongs to a series edited by Mr. G. F. Bosworth, F.R.G.S., but no author's name is given. It is well illustrated, a perhaps excessive number of the illustrations referring to war conditions. The actual geographical information given seems reasonably accurate, and it is put in an interesting fashion. It seems to us, however, that insufficient care has been taken with the composition, surely one of the most important points in a "Reader." For example, the following sentence, dealing with Naples, certainly lacks elegance, even if it succeeds in just avoiding an obvious trap: "Standing on the beautiful Bay of Naples, the city rises from its shores in a matchless panorama of palaces, villas, forests, gardens, vineyards, and mountains." In so far, also, as the sentence conveys to the pupil the impression that "mountains," "forests," and even vineyards occur in the heart of the city, it appears deceptive. The idea of the geographical reader is sound enough, but publishers and compilers alike are too apt to forget how difficult accurate descriptive writing is, and how much special training it demands.

A Text-Book of Oceanography. J. T. Jenkins, D.Sc., Ph.D. London: Constable and Co., Ltd., 1921. Pp. x + 206. Maps and diagrams. *Price* 15*s. net.*

The announcement of the first text-book of oceanography in the English language raised expectations which are not altogether fulfilled by this volume. The science is so essentially British in origin—it may be said to have been born in Edinburgh—that one hoped for a complete and authoritative volume to rank beside German, Russian, and even French works on the subject, and to supplement

such useful works as Fowler's *Science of the Sea* and Murray and Hjort's *Depths of the Ocean*. But Dr. Jenkins has produced only a sketch of oceanography "designed to meet the requirements of the higher forms of schools, of teachers in training, and of university students, as well as naval and mercantile marine officers." From this outlook he has done the task well, although we doubt very much if oceanography, even to this extent, can or should be crowded into the school curriculum. In accordance with the scope of the book, references are unfortunately not given, but an incomplete list of books is added as a short appendix. Ocean currents and deposits receive most attention. The chapter on the extent and depths of the ocean is very thin, and incidentally is badly edited, and repeats itself in places. In spite of the expense of maps, we cannot look upon such a chapter as adequate if it lacks, as this book does, a general chart of the ocean floor. The subject cannot usefully be treated by a list of the principal ocean deeps. The notes on sea ice invite certain criticisms. The term ice shoal (p. 84) has no meaning, and is possibly a misprint for ice floe. The place of Drygalski's observations on the rate of growth of sea-ice should be mentioned in order to give value to the data. The definitions of field, floe, and pack need to be overhauled and on p. 85 the idea of land ice or fast-ice is confused with ice foot. It is no more correct to say that all Arctic icebergs originate on the west coast of Greenland than to imply that all Antarctic bergs are tabular in form. We doubt very much if there is any authentic record of a berg 800 ft. high, to say nothing of 1700 ft. The chart of exceptional drifts of ice in the North Atlantic, taken, we believe, from the Meteorological Office Pilot Charts, must not be accepted too literally. The sea gives rise to strange stories, some of which are not meant for acceptance. Finally, we would fain ask, where is New Scotland (p. 51)? R. N. R. B.

Geography: Physical, Economic, Regional. By James Franklin Chamberlain, Ed. B., S.B., formerly Chairman, Department of Geography, University of California, Southern Branch, Los Angeles, California. 210 Illustrations. Pp. 509. J. B. Lippincott Company, London. (Lippincott's School Text Series.) *Price* 15*s. net.*

For a School Text this is an unusually attractive volume to the general reader, but if its contents are to be "got up" by the student its attractiveness may be seriously diminished for him. The treatment is popular rather than scientific, and there is a looseness in expression which diminishes the value of the more scientific parts. "Degrees of latitude are practically the same in length, but degrees of longitude are not"; "The winds cause currents as well as tides"—such sentences as these are too frequent. The geography of the United States is very fully and usefully discussed. The illustrations, though often of more value as decoration than as sources of information, are numerous and excellent.

North England: An Economic Geography. By L. Rodwell Jones, B.Sc. Illustrated. Pp. vi + 256. London: George Routledge and Sons, Ltd., 1921. *Price* 6*s. net.*

It is impossible in a short review to do justice to this admirable volume, which is "mainly concerned with the physical environments which have influenced the evolution of some of our greatest industries." The dynamic factors which have determined the localisation of industries are searchingly analysed, and the modifications entailing change of site, or change of scale, of production are also under inquiry. The principles and results that emerge are shown clearly and simply, and much interesting knowledge is imparted. Facts and figures, so far as possible,

are up to date. Hull has now (1921) established a wool market, so that London's monopoly is seriously threatened. The importance of the concealed coalfield of Yorks, Derby, and Notts is emphasised; "one-tenth of the collieries now actually working (in the Yorks, Derby, and Notts field) are on the concealed field, but these produce rather more than one-third of the total coal raised." Light is also thrown on the establishment of the lace industry at Nottingham. Explanatory figures accompany the letterpress. Throughout the volume is suggestive and instructive, and it may be safely said that future writers on this important area cannot afford to ignore Mr. Jones's work. It is a pity that a book of such outstanding merit has no index, and is marred by several typographical errors, the worst of which appears at the foot of page 191.

The "Citizen of the World" Geographies: Europe of To-Day. By J. F. Unstead, M.A., D.Sc. London: Sidgwick and Jackson, 1921. *Price* 4*s. net.*

Goldsmith has supplied Dr. Unstead with a happy title for the series of geographies of which the above is the second volume, the other three being in preparation.

In writing the book the author had two objects in view, viz. to give such an account of the New Europe that the general reader could understand the changes which have taken place as a result of the War, and the problems still awaiting solution, and to produce a book suitable for study by Secondary and Day Continuation School pupils. Both of these aims have been adequately accomplished. To the work Dr. Unstead has brought a fine faculty of driving a straight line through his subject, and a determination not to be led into enticing and interesting bypaths. In crisp and lucid language, and with a nice sense of proportion, he treats the continent regionally to get a proper setting for the social, economic, and political lives of the inhabitants of the states or groups of states. An exhaustive account has not been attempted, but the results of environment are clearly shown, the human point of view is always in the forefront, and the interdependence of nations is insisted on.

A study of this heartily welcome volume can hardly fail to stimulate that intelligent and sympathetic understanding of our own and other people's lives which will be so necessary for the future goodwill of nations and the wellbeing of the world.

In the note on page 1 Fig. 4 should read Fig. 6.

A Sketch-Map Geography. By E. G. R. Taylor, B.Sc. Pp. viii + 147. London: Methuen and Co., Ltd., 1921. *Price* 4*s.*

A noteworthy departure from the stereotyped text-book of geography has been made by Miss Taylor, and her method of teaching geography, as exemplified in this book, while not original, is sure to produce good results by students whose knowledge is tested by examinations, and by the general body of learners who desire to know the "why" of things geographical. Briefly, the book consists of a very large number of maps explained by a series of succinct notes, the underlying idea being that the maps may be studied first, and the notes read afterwards to fill up gaps in the interpretation of the maps. It is not intended that the book be used by younger pupils, but older pupils and students have here an excellent means of acquiring and testing their knowledge and understanding of geographical facts and principles.

For the system Miss Taylor claims, and we think rightly, that it will aid independent thinking, as opportunities are given to scholars "to work out for

themselves causal relations and geographical principles." Further, the law of association of ideas will enable them to remember groups of related facts; and the ability and desire to illustrate by sketch map will be fostered.

There is just a fear that in the hands of mechanical teachers or lazy pupils the book may encourage cramming. But the advantages of the method have already been proved to outweigh by far the disadvantages, and to capable teachers and students the book will be of the greatest service. Special praise must be given to the clearness and simplicity of the maps, and to the lucidity of the accompanying notes, both of which rigidly exclude non-essential matter.

The Groundwork of Modern Geography. By ALBERT WILMORE, D.Sc., F.G.S. Pp. xv + 396. London: G. Bell and Sons, Ltd., 1920. *Price* 6*s. net.*

While "the writer of a book on geography can scarcely hope to be really original," he can attempt to write in a fresh, interesting, and accurate manner on whatever part of this wide subject he takes up. This is what Dr. Wilmore has successfully achieved. In Section A his groundwork is Structural Geography, and with a mind responsive to the essentials of geographical study the author's treatment of the geology of the earth's surface, illuminating and remarkably full, is terse, pleasing, and not overburdened with detail, while the gradations are natural and logical. It is a real pleasure to read what in less competent hands might have been dreary and repelling. Note should be made of his two chapters on the economic geography of the rocks. Section B deals with the Principles of Climatic Geography; Biological Geography claims Section C; both sections are on the high level of Section A. Reference must be made to the chapter on the Distribution of Population and the Location of Towns.

Any student who "gets up" this book (which has not been written for cramming purposes) will find his zest for further geographical knowledge quickened, and he will have a sure foundation on which to build the superstructure of the "New" Geography. Teachers will find it stimulating and helpful. Excellent photographs and diagrams illustrate the text, and the "running" Bibliography, the Appendix of Questions, Glossary, and Index ought to be mentioned.

The Rainfall of the British Isles. By M. DE CARLE S. SALTER. London: University of London Press, Ltd., 1921. *Price* 8*s.* 6*d. net.*

We are indeed grateful to Mr. Salter for having presented us with such an interesting and well-written book as we have here. No one, we think, could have done better justice to such a subject than the present Superintendent of the British Rainfall Organisation (Meteorological Office). Full of facts that might have been treated in an uninteresting manner, we are kept at a high pitch of attention throughout. For once rain is interesting.

After a short introduction upon method of study and sources of information the author describes in clear and lucid language the most modern physical theories of rain formation that have been advanced by meteorologists. These theories are three in number, viz.: convectional, cyclonic, and orographical. Rain-gauges, their construction and exposure, are then discussed, and many diagrams and illustrations make clear the text. Then follows a discussion of how rainfall data are gathered, utilised, and mapped. The incidence and frequency of daily rainfall are next reviewed, followed by chapters on the types of regional and seasonal distribution, fluctuations of annual rainfall, and the relation of rainfall to configuration. The book concludes with a chapter on the economic application of rainfall data. A glossary of scientific terms is added.

It is of interest, and indeed a matter of self-congratulation, to learn that there are some five thousand rainfall observers in the British Isles, the majority of whom are voluntary observers. Most of the data of this book have been taken from the records published by the British Rainfall Organisation, to which organisation many of these observers have given their records. Probably no country in the world is better organised than the British Isles for the collection of rainfall data.

Mr. Salter has indeed been successful in bringing together "some of the general conclusions so far deduced," and by using simple language, and plenty of illustrations, maps, and tables, has endowed his work with what we believe will be a long and useful life.

Agricultural Meteorology: The Effect of Weather on Crops. By J. Warren Smith. New York: The Macmillan Co., Ltd., 1920. *Price* 13*s. net.*

This is a text-book principally for the agricultural student, and to him is brought home the importance of weather and climate upon his daily work. The author is in charge of the Division of Agricultural Meteorology in the United States Weather Bureau, is an important investigator in agricultural meteorology, and is thus well qualified to handle this important subject.

The book is, unfortunately, somewhat condensed. Take as an example the first chapter. Here in some twenty-one pages an attempt has been made to condense a complete introduction to the science of meteorology. Considering that it is upon this chapter that the foundation of the meteorology of the book is based, it is hardly fair to the student. A chapter on the methods of correlation is a useful one, though again all too short. The main portion of the book then follows: namely the discussion of the work of a number of investigators in correlating the weather with various crops, and here the author has given himself more elbow room. The book closes with a rapid glance at weather forecasting, frost and lightning protection. At the end of each chapter a table of references to standard books and papers is appended. This is extremely useful, much to be commended, and very stimulating to any one more than usually interested in the subject under discussion. A set of laboratory exercises is also added. The book contains many excellent diagrams, graphs, and pictures. This is not quite the first text-book on agricultural meteorology as the author claims in his preface. M. Klein had already produced as far back as 1911 his *Météorologie agricole.*

BOOKS RECEIVED.

The Rainfall of the British Isles. By M. de Carle S. Salter. 8vo. Pp. xiii + 295. London: University of London Press, Ltd., 1921. *Price* 8*s.* 6*d.*

The Scottish Mountaineering Club Guide. Vol. I. October 1921. Section A.—Geology: Meteorology: Botany: Bird Life: Equipment: Maps, etc.: Rock and Snow Craft: Photography: Sir Hugh Munro's Classified Tables of the 3000 feet Mountains of Scotland. Edited by James Reid Young. Edinburgh: Scottish Mountaineering Club, 1921. *Price* 7*s.* 6*d. net.*

Travel in the Two Last Centuries of Three Generations. Edited by S. R. Roget, M.A. Illustrated. 8vo. Pp. 254. London: T. Fisher Unwin, 1921. *Price* 16*s. net.*

The New Zealand Official Year-Book, 1920. Wellington, N.Z.

Handbook of Meteorology. A Manual for Co-operative Observers and Students. By Jacques W. Redway. 8vo. Pp. 294. New York: John Wiley and Sons, Inc., 1921.

Geography for Senior Classes. By E. Marsden, B.A., and T. Alford Smith, B.A. 8vo. Pp. 531. London: Macmillan and Co., Ltd., 1921. *Price 7s. 6d. net.*

In the Track of the Trades. The Account of a Fourteen Thousand Mile Yacht-ing Cruise to the Hawaiis, Marquesas, Societies, Samoas, and Fijis. By Lewis R. Freeman. Illustrated. 8vo. Pp. 380. London: William Heinemann, 1921. *Price 25s.*

In the Land of Lalla Rookh: Being Impressions of a Thousand Mile Tramp through the Vale of Cashmere. By Ardaser Sorabjee N. Wadia, M.A. 8vo. Pp. 242. London: J. M. Dent and Sons, Ltd., 1921.

Studies in North Africa. By Cyril Fletcher Grant. 8vo. Pp. 256. London: Simpkin Marshall, Hamilton, Kent and Co., Ltd., 1921. *Price 8s. 6d.*

The Senior Scientific Geography. By Ellis W. Heaton, B.Sc., F.G.S. Cr. 8vo. Pp. 874. London: Herbert Russell, 1921. *Price 8s. 6d.*

The Great White South: Being an Account of Experiences with Captain Scott's South Pole Expedition and of the Nature Life of the Antarctic. By Herbert G. Ponting, F.R.G.S. 8vo. Pp. xxvi + 306. London: Duckworth and Co., 1921. *Price 30s.*

Europe—Whither Bound? Being Letters of Travel from the Capitals of Europe in the Year 1921. By Stephen Graham. 8vo. Pp. 224. London: Thornton Butterworth, Ltd., 1921. *Price 10s. 6d. net.*

East Carelia and Kola Lapmark. Described by Finnish Scientists and Philologists. Theodor Homen. 8vo. Pp. xiii + 264. London: Longmans, Green and Co., 1921. *Price 21s. net.*

The World. Book III. For Senior Students. With 275 Maps and Diagrams. New Edition. 8vo. Pp. 613. London: Longmans, Green and Co., 1921. *Price 7s. 6d.*

The Home of Faddless Splendour: or, Palestine of To-day. By George Napier Whittingham. With a foreword by Major-General Sir Arthur Wigram Money, K.C.B., C.S.I. 8vo. Pp. xiv + 360. London: Hutchinson and Co., 1921. *Price 24s.*

The Teaching of Geography and Economics. (*The New Educator's Library.*) Fcap. 8vo. Pp. 115. London: Sir Isaac Pitman and Sons, Ltd., 1921. *Price 2s. 6d.*

South with Scott. By Captain E. R. G. R. Evans, C.B., D.S.O., R.N. With Diagram and Three Maps. 8vo. Pp. 284. London: W. Collins Sons and Co., Ltd., 1921. *Price 10s. 6d.*

Chinese Motifs. Written and Illustrated by Miss Emily G. Kemp, F.R.S.G.S. 8vo. Pp. 227. London: Hodder and Stoughton, 1921. *Price 12s. 6d.*

The Historical Geography of the Weälden Iron Industry. By Mary Cecilia Delany. 8vo. Pp. 62. London: Benn Brothers, Ltd., 1921. *Price 4s. 6d.*

Greenland by the Polar Sea. The Story of the Thule Expedition from Melville Bay to Cape Morris Jesup. By Knud Rasmussen. Translated from the Danish by Asta and Roland Kenney. With Preface by Admiral Sir Lewis Beaumont, G.C.B. Eight Colour Plates. Imperial 8vo. Pp. xxiii + 327. London: William Heinemann, 1921. *Price 36s. net.*

A Text-Book of Geography. By G. Cecil Fry, M.Sc. 4th Edition. 8vo. Pp. xxiv + 527. London: University Tutorial Press, Ltd., 1921. *Price 6s. 6d.*

History of Glasgow. By Robert Renwick, Esq., LL.D., and Sir John Lindsay, D.L. Vol. I.: Pre-Reformation Period. 8vo. Pp. lii + 434. Glasgow: MacLehose, Jackson and Co., 1921. *Price 25s.*

The Blue Guides: Paris and its Environs. Edited by Findlay Muirhead and Marcel Monmarche. Sixty Maps. 8vo. Pp. lxiv + 417. London: Macmillan and Co., Ltd., 1921. *Price 12s.*

Twenty Years in Roumania. By MAUDE R. PARKINSON. 8vo. Pp. 255. London : George Allen and Unwin, Ltd., 1921. *Price* 10*s.* 6*d. net.*

Ulster. Edited by GEORGE FLETCHER, F.G.S., M.R.I.A. With Maps and Illustrations. 8vo. Pp. xi + 186. Cambridge : University Press, 1921. *Price* 6*s.* 6*d. net.*

Munster. Edited by GEORGE FLETCHER, F.G.S., M.R.I.A. 8vo. Pp. xi + 176. Cambridge : University Press, 1921. *Price* 6*s.* 6*d. net.*

Les Régions Géographiques de la France. By EM. DE MARTONNE. 8vo. Pp. 190. Paris : E. Flammarion, 1921. *Prix* 4 *fr.* 50.

British Rainfall, 1920 : *Report on the Distribution of Rain in the British Isles*, 1920. London : H.M.S.O., 1921. *Price* 12*s.* 6*d. net.*

Geography for Serbian Schools (in Serbian). 1. Elementary Geography ; 2. Extra-European Continents ; 3. Europe (excluding the Serb-Croat-Slovene State) ; 6. Elementary Physical Geography. By Prof. T. RADIVOJEVIĆA. Belgrade : Gece Kona, 1921.

The People of Palestine. By ELIHU GRANT. Forty-five Illustrations. 8vo. Pp. 271. London : J. B. Lippincott Co., 1921. *Price* 10*s.* 6*d.*

The Mauritius Almanac and Commercial Handbook for 1921. Port Louis, 1921. *Price Rs.* 10.

Colonial Reports. Nyasaland (1075) ; Bermuda (1077) ; Northern Territories of the Gold Coast (1082) ; Bechuanaland (1083) ; St. Helena (1084) ; Basutoland (1085) ; Ceylon (1086) ; Gilbert and Ellice Islands (1088) ; Barbadoes (1087) ; East Africa (1089) ; Sierra Leone (1090) ; Zanzibar (1091) ; Cayman Islands (1092) ; Cyprus (1093) ; Bahamas (1095) ; Nyasaland (1096).

The Geology and Mineral Resources of the Serb-Croat-Slovene State : Being the Report of the Geologist attached to the British Economic Mission to Serbia. By D. A. WRAY, B.Sc., F.G.S. London : H.M.S.O., 1921. *Price* 3*s.* 6*d.*

Annual Statement of the Trade of the United Kingdom with Foreign Countries and British Possessions, 1920. Vol. II. London : H.M.S.O., 1921. *Price* £2 *net.*

Agricultural Statistics, 1920. Vol. IX. Part III. *Prices and Supplies of Grain, Live Stock, etc. of Scotland.* London, 1921. .

Publishers forwarding books for review will greatly oblige by marking the **price** *in clear figures, especially in the case of foreign books.*

NEW MAPS AND ATLASES.

EUROPE.

ORDNANCE SURVEY OF SCOTLAND.—The following publications were issued from 1st July to 30th September 1921 :—

Six-inch and Larger Scale Maps. Six-inch Maps (revised). Full sheets with contours in red. Price 4s. each. *Lanarkshire.*—Sheet **13**. *Linlithgowshire.*—Sheet **13**. *Stirlingshire.*—Sheet **24** (filled with Fifeshire, parts of Sheet **37**).

1 : 2500 Scale Maps (revised), with houses stippled and with areas. Price 5s. each. *Argyllshire.*—Sheets **256**—(12 and 8), 16 ; **257**—1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 ; **258**—1, 5, 9, 14.

ERRATUM.—In Supplement to Catalogue of Scotland for 30th June 1920, 1 : 1250 Scale Maps, *Renfrewshire.*—Sheet 2—6 NE. should be Sheet 2—6 SE.

GEOLOGICAL SURVEY OF SCOTLAND.—The following publications were issued from 1st July to 30th September 1921:—

Economic Memoirs.—*Special Reports on the Mineral Resources of Great Britain.* Vol. XVII. The Lead, Zinc, Copper, and Nickel Ores of Scotland. By G. V. Wilson, B.Sc., with contributions by John S. Flett, LL.D., F.R.S. Price 7s. 6d net. *The Economic Geology of the Central Coalfield of Scotland.* Area IX.—Carluke, Strathaven, and Larkhall with Braidwood, Netherburn, Auchenheath, Blackwood, and Stonehouse. By L. W. Hinxman, B.A., F.R.S.E.; R. G. Carruthers, F.G.S.; M. MacGregor, M.A., B.Sc.; and C. H. Dinham, B.A. Price 8s. net.

District Memoirs.—*Description of Arthur's Seat Volcano.* By B. N. Peach, LL.D., F.R.S. Second Edition. Price 2s. 6d. net.

Six-inch Maps.—With geological lines; uncoloured. Price 2s. 3d. each. *Lanarkshire.*—20 NW. *Linlithgowshire.*—8 SE.; 11 NE.; 12 NW. Revised Edition.—*Linlithgowshire.*—3 SW.

ADMIRALTY CHARTS.

Scotland, West Coast.—River Clyde, Gourock to Dumbarton, Oct. 1921. No. 2006. Price 4s. *Admiralty, London.*

AN AGRICULTURAL ATLAS OF WALES.—Prepared by J. Pryse Howell for the Institute for Research in Agricultural Economics, Oxford, 1921. Price 5s.
Ordnance Survey, Southampton.

A series of maps showing the distribution of lands, crops, and livestock over the Principality, together with three loose maps showing rainfall, geology, and altitudes.

BARTHOLOMEW'S GENERAL MAP OF EUROPE.—Showing boundaries, 1921. Price 2s. 6d., mounted on cloth.
John Bartholomew and Son, Ltd., Edinburgh.

BARTHOLOMEW'S CONTOUR MOTORING MAP OF FRANCE.—Scale 1 : 1,000,000. Third and improved edition, in two sections, in neat weather-proof, pocketed wallet. Price 15s. net.
John Bartholomew and Son, Ltd., Edinburgh.

PHILIP'S CONTOUR MAP OF CENTRAL EUROPE.—Scale 1 : 1,500,000. Mounted on cloth, dissected to fold in case. Price 27s. 6d. net.
George Philip and Son, Ltd., London.

THE GERMAN ELEMENT IN THE UPPER SILESIAN DISTRICTS OF RYBNIK AND PLESS.—In five maps, by Prof. Wilhelm Volz, Ph.D. 1921.
M. and H. Marcus, Breslau.

THE NATIONAL STRUCTURE OF THE POPULATION OF UPPER SILESIA.—In three maps, by Prof. Wilhelm Volz, Ph.D. 1921.
M. and H. Marcus, Breslau.

ASIA.

INDIA.—Showing railways open and under construction. March 1921. Price 1 rupee 8 annas. *Survey of India Offices, Calcutta.*

INDIA AND ADJACENT COUNTRIES.—Scale 1 : 1,000,000. Price 1 rupee, or 1 rupee 8 annas each. Sheet 69 (1) Layered; (2) Political, 1920. Sheet 75 (1) Layered; (2) Political, 1920. Sheet 76 (1) Layered; (2) Political, 1920.

Sheet 81 (1) Layered ; (2) Political, 1920. Sheet 84 (2) Political, 1920. Sheet 85 and part of 86 (1) Layered, 1919.

Survey of India Offices, Calcutta.

HALF-INCH SURVEY MAP OF INDIA.—Price each sheet 1 rupee, or 1 rupee 8 annas. Sheets—38-L/NE., 39-I/NE., 39-I/NW., 43-F/SE., 43-H/NW., 43-H/SE., 43-H/SW., 43-J/NE., 43-J/SE., 43-J/SW., 44-I/NW., 44-I/SE., 44-I/SW., 44-M/NE., 44-N/NW., 46-K/SW., 46-O/SE., 46-O/SW., 47-M/SW., 48-K/NE., 54-A/SE., 55-G/NE., 55-H/NW., 55-H/SW., 55-K/NE., 55-K/NW., 55-P/NW., 56-C/NE., 56-G/NE., 56-G/SE., 56-G/SW., 57-O/NW., 57-O/SE., 58-D/NE., 63-F/NE., 63-F/NW., 63-F/SE., 63-F/SW., 66-B/SW., 66-C/NW., 92-D/NE., 92-D/NW., 92-G/NE., 93-A/NE., 93-E/NW., 93-I/NW., 94-B/SE., 94-E/NE., 94-E/NW., 94-E/SE., 94-E/SW.

Survey of India Offices, Calcutta.

QUARTER-INCH SURVEY MAP OF INDIA.—Price 1 rupee 2 annas. Sheet 44A.

Survey of India Offices, Calcutta.

AFRICA.

BARTHOLOMEW'S REDUCED SURVEY MAP OF SOUTH AFRICA.—Coloured to show height of land. Scale 1 : 2,500,000. New edition. Price 2s. 6d. paper ; 5s. cloth. *John Bartholomew and Son, Ltd., Edinburgh.*

NORTH AMERICA.

SOUTHERN ALBERTA.—Map showing disposition of lands, 12½ miles to 1 inch. Seventeenth Edition, 1921. *Department of the Interior, Canada.*

PHILIP'S COMPARATIVE SERIES OF WALL ATLASES.

United States.—Edited by J. F. Unstead, M.A., D.Sc., and E. G. R. Taylor, B.Sc. Price 47s. 6d. net. *George Philip and Son, Ltd., London.*

A valuable addition to this excellent series.

AUSTRALASIA, ETC.

BARTHOLOMEW'S TOURING MAP OF NEW ZEALAND.—Scale 1 : 2,000,000. New Edition. Price 1s. 6d. paper ; 3s. cloth.

John Bartholomew and Son, Ltd., Edinburgh.

SKETCH-MAP OF THE PACIFIC OCEAN.—Scale 600 miles to 1 inch. Price 2s. 6d.

Sifton, Praed and Co., Ltd., London.

GENERAL MAPS AND ATLASES.

STANFORD'S NEW LIBRARY CHART OF THE WORLD, 1920.—On rollers.

Edward Stanford, Ltd., London.

CASSELL'S NEW ATLAS.—Edited by George Philip, F.R.G.S. Price 21s. net.

Cassell and Co., Ltd., London.

A clear atlas for general use, in which a feature is made of historical maps.

A SCHOOL ECONOMIC ATLAS.—By J. G. Bartholomew, LL.D. With an Introduction by L. W. Lyde, M.A. Fifth Edition. Revised. Price 6s.

Oxford University Press, London.

THE COMPARATIVE ATLAS.—By J. G. Bartholomew, LL.D., F.R.G.S. Sixty-four plates and Index. 1921 Edition. Price 4s. 6d. net.
Meiklejohn and Son, Ltd., London.

PHILIP'S PICTORIAL POCKET ATLAS OF THE WORLD.—New Edition. Price 2s.
George Philip and Son, Ltd., London.

REPORT OF COUNCIL.

Thirty-Seventh Session, 1920-1921.

(1st October 1920 to 30th September 1921.)

The Council have the honour to submit the following Report:—

Ordinary Membership.

The changes which occurred during the Session in the number of members were as follows:—

Number on 1st October 1920,		1360
New Members added,		93
		1453
Deduct by Death,	34	
„ Resignation,	46	
„ Arrears,	4	
		84
Number of ordinary members remaining on the roll on 30th September 1921,		1369

Of this number, 689 are on the Edinburgh list, 372 on the Glasgow list, 196 and 92 on the Dundee and Aberdeen lists respectively. In addition to those on the lists named, 39 members reside abroad, and 71 reside in England. The number of Life members in the total given above is 184.

Teacher Associate Members.

Number on 1st October 1920		349
New Members added,		105
		454
Deduct by Death,	3	
„ Resignation,	49	
„ Arrears,	2	
		54
Remaining on roll 30th September 1920,		400

The number of Associate Members at the various centres is as follows:—Edinburgh, 193; Glasgow, 216; Aberdeen, 24. In addition 52 reside in England and 5 abroad.

Fellows and Honorary Members.

There are seven Honorary Members, thirty Honorary Fellows, and one hundred and nine Ordinary Fellows of the Society, and thirty-seven Honorary Corresponding Members.

The Diploma of Fellowship was granted during the session to L. W. G. Malcolm, Brechin; Prof. B. C. Bhattacharya, M.R.A.S., Benares; James Y. Erskine, M.A., Edinburgh; A. Francon Williams, British Bhutan.

Society's Medals.

At a meeting of the Society held on 3rd February, Colonel Frederick M. Bailey, C.I.E., was presented with the Livingstone Gold Medal in recognition of the admirable geographical work he had done on the Upper Brahmaputra and in other parts of Central Asia.

The Society's Silver Medal was awarded to David C. T. Mekie, M.A., first in the merit list in the ordinary class in Geography in Edinburgh University.

The Library and Map Department.

During the past session, 229 books, 82 pamphlets, 141 reports, 37 atlases, 788 map-sheets and charts have been added to the Library. The transactions and periodicals regularly received number 158. The number of volumes borrowed by members was 2322, and the Library was, as usual, much consulted by others in search of geographical information.

The Council desire to record their thanks to the Foreign and Colonial Governments for the official publications they have presented to the Library; to the Treasury for the revised Ordnance Survey Maps of Scotland, both in outline and colour, as each of the revisions now in progress is published; to the Geological Survey of Scotland; to the Geographical Section, General Staff, War Office; to the Intelligence Department, War Office; to the Admiralty; to the British Museum (Natural History); to the Edinburgh University; to the Survey of India; and also to the under-mentioned private donors of books and maps, viz.:—Dr. Wm. S. Bruce; Prof. J. Paul Goode; Mr. D. R. Stewart; Miss K. A. Swinton.

Subscription for Associate Members.

At a meeting of the Society held on 16th September the subscription for Associate Members was raised from 10s. 6d. to 15s. per annum.

Donations.

From Mrs. Green—a very complete collection of old maps of Edinburgh and the Lothians, the property of the late Mr. Charles Green, F.R.S.E., of Gracemount, Liberton.

From Dr. Wm. S. Bruce—his complete collection of Maps, Charts, Atlases, and Plans of the Arctic and Antarctic Regions, also Lantern Slides and Lantern Slide Cases, Negatives, Photographs, and Chart Cases, etc., all lately housed in the Scottish Oceanographical Laboratory.

From Mrs. Bartholomew—a framed photograph of the late Dr. J. G. Bartholomew.

From Prof. J. Y. Simpson—the Original Report of the Latvian-Lithuanian Frontier Court of Arbitration.

Meetings of the Society.

The Society's Anniversary Meeting was addressed by Prof. J. Y. Simpson, D.Sc. Thirty-four Ordinary meetings of the Society were held, eight in Edin-

burgh, nine in Glasgow, nine in Dundee, and seven in Aberdeen. In addition, eight afternoon Lectures were delivered in Edinburgh.

These meetings were addressed by Dr. Nelson Annandale; Rev. J. W. Arthur, O.B.E., M.D.; Col. Frederick M. Bailey, C.I.E.; Capt. J. Broadhurst, R.A., F.R.G.S.; Miss M. A. Czaplicka, F.R.I.A., F.R.G.S.; Dr. Vaughan Cornish, F.G.S., F.C.S.; Rev. J. R. Fleming, F.R.S.G.S.; Mr. Seton Gordon, B.A. Oxon., F.Z.S., M.B.O.U.; Mr. Ernest J. Hotson; Miss Emily G. Kemp, F.R.S.G.S.; Mr. John Mathieson, F.R.S.E., F.R.S.G.S.; Mr. F. C. Mears; Dr. M. I. Newbigin; Prof. Charles Sarolea, D.Ph. and Litt., F.R.S.G.; Prof. J. Y. Simpson, D.Sc.; Captain Kingdon Ward, B.A., F.R.G.S.; Prof. B. J. Wilden-Hart, F.R.G.S.

The Scottish Geographical Magazine.

The *Magazine* has been published quarterly during the past session, the issue for Jan. 15, 1921, forming the "Glasgow" number. Publication of this was rendered possible by the aid of a grant from the Corporation of Glasgow, and the long series of articles by distinguished Glasgow citizens, the maps and the illustrations which it contains, make it a worthy pendant of the "Edinburgh" number. In addition to the *Magazine* a billet, containing notices of lectures, lists of books added to the Library, and other information, has been issued at intervals, in order to make up, so far as possible, for the absence of a monthly magazine.

The Council desire to acknowledge their obligations to the contributors of articles, and to the following, who have rendered valuable assistance to the editors:—Mr. J. E. Belasco; Mr. J. H. Birrell; Dr. R. N. Rudmose Brown; Mr. H. M. Cadell; Mr. A. P. Gray; Dr. John Gunn; Mr. L. Hinxman; Mr. N. M. Johnson; Mr. W. R. Kermack; Dr. C. G. Knott; Mr. John Macfarlane; Miss G. Meiklejohn; Mr. J. D. Monro; Rev. Dr. Morrison; Mr. T. S. Muir; Mr. D. Pryde; Mr. Ralph Richardson; Mr. Ikbal Ali Shah; Mr. A. Stevens; Mr. H. R. Wallis; Mr. E. M. Wedderburn; and Mr. W. B. Wilson.

Obituary.

The Council regret to have to record, among others, the deaths of the following members:—Rt. Hon. Lord Balfour of Burleigh; Colonel Sir J. R. Dunlop Smith; Sir Rowand Anderson; Rt. Hon. Lord Ruthven; Sir Charles Barrie; Colonel Wardlaw Ramsay; Rt. Hon. Lord Cheylesmore; Colonel H. Burnby-Campbell; Dr. Erskine Beveridge.

National Collection of Old Maps of Scotland.

The Committee in charge of the National Collection of Maps of Scotland, owing to the expense incurred in the publication of the volume of early views and maps of Edinburgh, have been unable to add much to the collection by purchase, but several fine county maps have been presented, and it is hoped that further donations will come forward. In order to complete the set of Maps of Scotland a copy of Cowley's Map of Scotland, 1734, is wanted.

In connection with the meeting of the British Association an Exhibition showing the collection of Early Views of Britain and old maps of Edinburgh was placed in the Rooms used by the Geographical Section, and a lecture was given by Mr. William Cowan and Mr. H. G. Inglis.

Finance.

The Annual Financial Statement here follows.

ABSTRACT OF THE ACCOUNTS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY

From 30th September 1920 *to 30th September* 1921.

FUNDS AT 30TH SEPTEMBER 1920:—					
£400 Dominion of Canada 3½ per cent. Registered Stock, 1930-50 (Deposited with Treasury), cost				£405	1 0
£1777, 7s. 7d.—5% War Stock, 1929-47, cost				1686	7 6
£100—5% Exchequer Bonds, due 1st April 1922,				100	0 0
				£2191	8 6
BALANCES due by Banks:—					
On Account Current,	£29	7	6		
On Deposit Receipt,	137	10	0		
On Do. do. (Glasgow Equipment Fund)	81	11	9		
				248	9 3
Petty Cash on hand,				1	11 11½
Balance due by Aberdeen Treasurer,				0	12 11
				£2442	2 7½
Less—Subscriptions received in advance,	£13	13	0		
Associates paid in advance,	3	13	6		
				17	6 6
				£2424	16 1½

Note.—The Glasgow Corporation Donation of £200 has been deducted from the Expenses of Publication of *Magazine*.

SUBSCRIPTIONS from Ordinary Members,	£1290	9	0		
Less—Paid in Advance,	32	11	0		
	£1257	18	0		
SUBSCRIPTIONS from Associate Members, less paid in advance, £2, 6s. 6d.,	212	2	0		
DIPLOMA and LIFE MEMBERSHIP FEES,	49	4	0		
DIVIDENDS and INTERESTS,	128	7	1		
GOVERNMENT GRANT,	200	0	0		
INCOME TAX recovered for year ending 5th April 1921,	4	16	0		
ENTRANCE FEES from new Members,	59	6	6		
				1911	13 7
INTEREST ON DEPOSIT RECEIPT (Glasgow Equipment Fund),				3	6 2
Note.—Expenditure for 1920-21,	£2009	5	8½		
Receipts for 1920-21,	1911	13	7		
Excess Expenditure for 1920-21,	£97	12	1½		
				£4339	15 10½

MAGAZINE—Expenses of Publication, etc.:—					
Printing and other charges,				£906	17 5½
Illustrations,				24	15 0
Maps,				117	13 7
				£1049	6 0½
Less—Magazines sold,	£255	6	1		
Advertising Receipts,	111	12	6		
Glasgow Corporation Donation,	200	0	0		
				566	18 7
				£482	7 5½
GENERAL PRINTING and STATIONERY,				63	6 7
BOOKS and other furnishings for Library,				54	19 7
EXPENSES in connection with Lectures—*Less* Lecture Tickets sold,				464	12 5
RENT OF COUNCIL ROOM, Taxes, Gas, Repairs, Insurance, etc.,				234	7 3½
SALARIES,				584	1 8
MISCELLANEOUS, including General Expenses, and Postages,				121	0 8½
MEDALS.				4	10 0
				£2009	5 8½

FUNDS AT 30TH SEPTEMBER 1921:—					
£400 Dominion of Canada 3½ per cent. Registered Stock, 1930-50, cost				£405	1 0
£1777, 7s. 7d.—5% War Stock, 1929-47, cost				1686	7 6
£100—5% Exchequer Bonds, due 1st April 1922,				100	0 0
				£2191	8 6
BALANCES due by Banks:—					
On Account Current,	£45	10	7		
On Deposit Receipt,	22	10	0		
On do. do. (Glasg. Equipment Fund),	84	17	11		
				152	18 6
Petty Cash on hand,				3	0 8
Balance due by Aberdeen Treasurer,				0	11 8
Due by Treasurer,				17	8 4
				£2365	7 8
Less—Subscriptions received in advance,	£32	11	0		
Associates paid in advance,	2	6	6		
				34	17 6
				2330	10 2
				£4339	15 10½

Edinburgh, 17th October 1921.—I have examined the Accounts of the Royal Scottish Geographical Society for the year ended 30th September 1921, of which the above is an Abstract and compared them with the Vouchers and Instructions thereof, and I find the whole to be correctly stated and sufficiently vouched and instructed.

P. C. ROBERTSON, M.A., C.A., Auditor.

LIVINGSTONE MEDAL FUND.

FUNDS AT 30TH SEPTEMBER 1920 :—						
£572, 12s. 5d. —5% War Stock, 1929-47, cost			£543	19	10	
Deposit Receipt Commercial Bank of Scotland, Limited			196	1	5	
			£740	1	3	
INCOME RECEIVED :—						
Interest on £572, 12s. 5d. —5% War Stock, 1929-47, untaxed,			28	12	8	
			£768	13	11	
MEDAL,						[illegible]
FUNDS AT 30TH SEPTEMBER 1921 :—						
£572, 12s. 5d. —5% War Stock, 1929-47, cost		£543	19	10		
Deposit Receipts with Commercial Bank of Scotland, Limited,		196	1	5		
		£740	1	3		
Less due to Treasurer,		17	7	4		
					722	[illegible]
					£768	13 11

Edinburgh, 17th October 1921.—Examined and found correct.

P. C. ROBERTSON, M.A., C.A., Auditor.

THE SCOTTISH

GEOGRAPHICAL

MAGAZINE.

ALPINE LAKES.[1]

By Leon W. Collet, D.Sc., Professor of Geology,
University of Geneva.

(With Illustrations.)

Introductory.

This subject has a twofold aspect: economic and scientific. As to the former, you all know that Switzerland does not possess any true coal-fields: water power is to us what coal is to you, hence the journalistic term "white coal" so often used in my country to denote water power. This "white coal" is the ice of the glaciers which feed our streams and lakes and are the source of our electric power.

Since most of our rivers are fed from the summer melting of glaciers, they are much fuller in summer than in winter. In winter hardly any melting occurs, and it is then that we most need water power, that is to say electricity. Therefore we want to regularise artificially the summer output of the streams in such a way as to increase their winter output. From this you will gather at once the great importance to Switzerland of hydrographical research, and especially of the study of lakes. The object is to accumulate in existing lakes, or in artificial lakes, the summer overflow of the glaciers, so as to have it ready for use in winter.

While I was Director of the Swiss Hydrographical Survey, the lakes of Switzerland were studied, during the last eight years, as regards variation in their levels, their rate of silting up owing to the deposit of

[1] An address delivered at the Edinburgh Meeting of the British Association for the Advancement of Science (Geological Section), September 1921.

alluvium from tributary streams, and also as regards their geological origin.

We may therefore consider the Swiss lakes from these three points of view.

I. The Level of the Lakes.

From the geographical standpoint Switzerland is divided, from north to south, into three parts:—1. The Jura Range; 2. The Swiss Plateau; 3. The Alps.

1. The Jura consist of parallel ridges, the highest summits of which do not exceed 1600 metres (5200 feet). They do not, therefore, possess any glaciers. It follows that the streams and lakes within them are subject essentially to the laws of rainfall and springs.

2. Most of the larger Swiss lakes of the plateau region are fed by streams issuing from the large glaciers of the Alps. The variations in their levels depend, therefore, to a great extent on the melting of the ice in summer, and to some extent on the rainfall which feeds those of the tributaries which have their source within the plateau.

3. The water-level of the Alpine lakes, which are much smaller than the Swiss Plateau lakes, depends entirely on the melting of the glaciers.

In the graph forming Fig. 1, the curve for the Lake of Geneva or Lake Leman shows that of a typical Alpine lake: the level rises from the month of May, it then passes through a maximum during the month of August, and sinks after September. The lowest levels occur during winter: we have here an exact reflection of the melting of the glaciers.

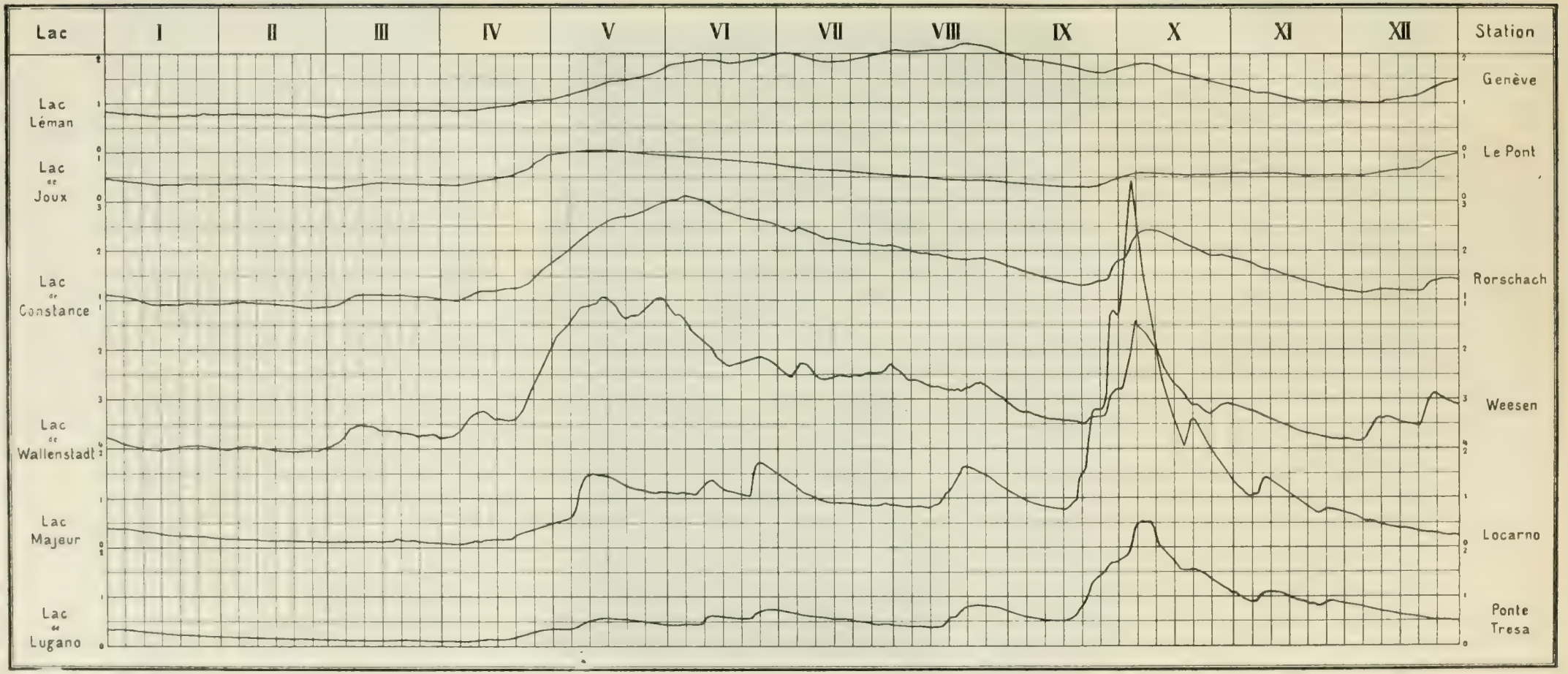
The curve for the Lake of Joux—which belongs to the Jura region—is quite different from that of the Lake of Geneva. The highest water-level occurs in May as the result of rain and of the melting of the winter snows; after that month the level sinks during summer and winter.

The curves for the Lake of Wallenstadt, Lake Maggiore, and the Lake of Lugano illustrate conditions in lakes the level of which is influenced in summer by the melting of glaciers, and in autumn by the rainfall.

An exact knowledge of the variations in the levels of lakes is therefore of the greatest practical importance where it is desired to erect an artificial dam, in order to raise the water-level so as to store up the water required to increase the output of the streams at the time of their minimum.

II. Duration of the Lakes.

Let us now consider the duration of a lake, a question of paramount importance. Before creating an artificial lake we must estimate as exactly as possible its probable duration. We have in the Alps numerous instances of alluvial plains, which are nothing but former lake-basins



Block lent by the Geographical Society of Geneva.

FIG. 1. —Monthly variations of water-level in different types of Swiss lakes.

now filled up by the alluvium deposited by tributary streams. Fig. 2 is a good illustration of one of those old lake basins transformed into an alluvial plain. It shows the plain of Barberine 1800 metres (6000 feet) above sea-level. The Swiss Railway Department is erecting a dam 40 metres (130 feet) high at the lower end of the plain in order to transform it into a lake. One might reasonably think that there is a certain risk of the new lake undergoing silting up and subsequent re-transformation into an alluvial plain. But a study of the catchment area has shown that the present alluvial plain is due mostly to the deposition in the lake of morainic material which formerly covered the

Photo by L. W. Collet.

FIG. 2.—The plain of Barberine, an old lake basin filled up by alluvium.

catchment area. Since this has already been removed, there is no danger of the future lake undergoing silting up before the time when the capital invested in the works will have been paid up. But all cases are not so simple, and I have made a thorough study of the way in which detrital matter is carried by tributary streams into lakes.

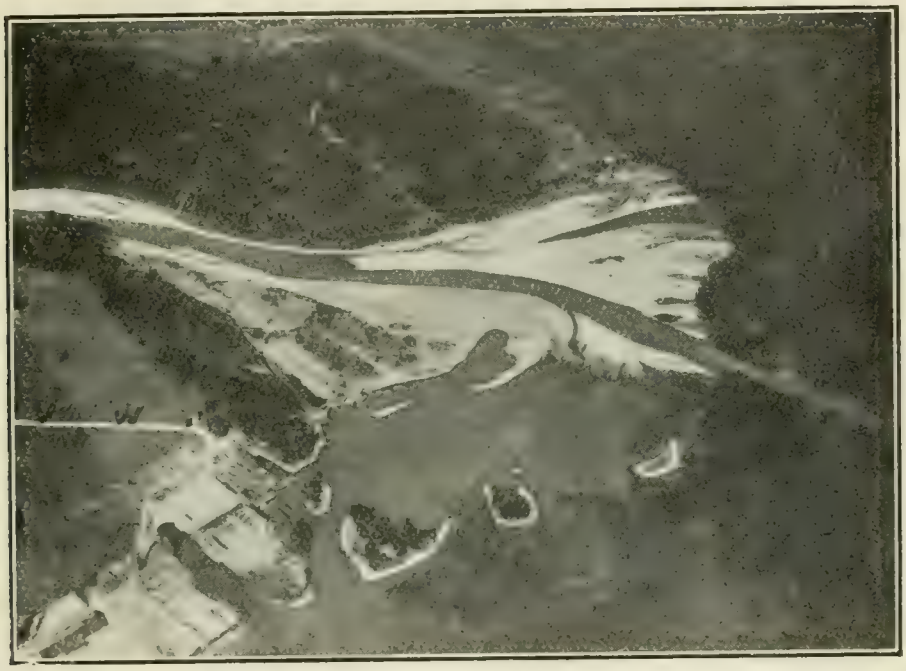
Mineral matter carried into lakes by streams may be classified as follows :—

1. Pebbles and gravels rolled on the stream bed.
2. Fine matter held in suspension and carried by the water.

Pebbles and gravels rolled on the stream bed are deposited as soon as the stream enters a lake, and form—as shown in Fig. 3—a delta, of which the greater part is under water. The river Kander, which flows

into the Lake of Thun, after having deposited its coarser materials on the rapid slope of the delta, carries its finer matter into the open water, where it settles on the lake floor. In order to estimate as exactly as possible the amount of material rolled on a stream bed, I proceeded as follows. The bathymetric charting of our lakes has always been very accurate, especially as regards the under-water portion of the deltas. What I did was to get the various deltas surveyed anew, and I was thus able to calculate the volume of matter deposited between the date of the first survey and that of the second. It is thus easy to calculate the volume of matter rolled on the stream bed during one year. These charts may be prepared again in ten or twenty years.

If, on the one hand, it is easy to estimate the increase of a delta, on



Photo, Ad Astra Aero.

FIG. 3.—The delta of the river Kander in the Lake of Thun, taken from an aeroplane.

the other hand it is almost impossible to estimate, in the lake itself, the amount of fine matter brought in by streams. The distribution of this fine matter depends on several factors, such as winds, surface currents, deep currents, etc., which are shown to be very variable.

The Swiss Hydrographic Survey had begun, under the direction of my predecessor, to immerse on the floor of the lakes flat boxes held fast to the shore by cables. By means of these boxes it was intended to estimate the amount of fine material deposited at great distances from the delta. Fig. 4 shows the raising out of the water of one of these boxes, on the bottom of which the thickness of deposited silt is measured. After trials made in different lakes I have been obliged to abandon this costly method, which proved absolutely insufficient.

The only other method left was to estimate the amount of suspended matter in the stream itself, before its junction with the lake.

Here the presence of an unknown factor soon made itself felt. It is the variation between the amount of fine matter held by the surface water and the amount held by the deeper water. It is easy enough to collect samples of surface water, and then estimate the amount of matter held in suspension by filtering the water and weighing the mineral matter; but the question becomes complicated if it is required to collect a sample of water from a certain depth in a rapidly flowing stream.

By means of the apparatus represented in Fig. 5, it has been possible to procure samples of water from any depth, with the view of determining the amount of suspended matter. The apparatus consists of a tube, which is traversed by the flowing water; a spring fixed to the rod to which the tube is attached releases the two lids which close instan-

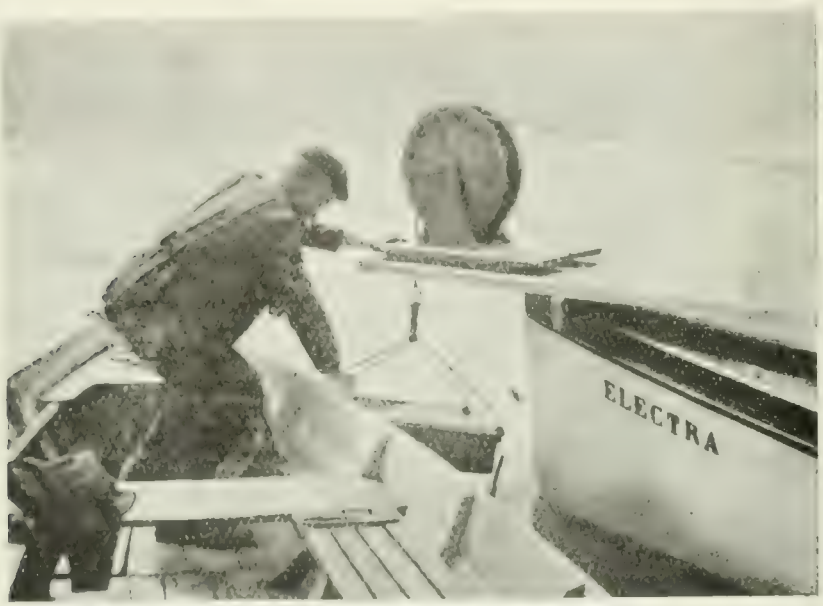


FIG. 4.—Box being raised from floor of lake.

taneously the openings of the tube. Water to the amount of the volume of the inside of the tube is thus cooped up instantaneously.

With this apparatus I got the interesting result that the amount of mineral matter held in suspension in a river increases from the surface towards the bottom, and that it is at 20-30 centimetres (8-12 in.) above the bed that the maximum is reached: this is just where the speed of the water is at a minimum, owing to the friction on a stream bed.

This fact is explained easily by means of a theory adopted by hydraulic engineers, according to which the friction of the water on the stream bed produces small sucking vortices. The mineral matter in suspension in this zone, situated close to the stream bed, does not come from the surface, but comes from the bed itself, being continually sucked up by the vortices. We therefore come to the conclusion that there is near the bottom a kind of sand stream, of small thickness, flowing under the water stream.

The ratio between the amount of mineral matter at the surface and that near the bottom of the stream can vary from 1 to 30 in cases of strong uprising of the water.

On the basis of measurements made on the suspended matter in the surface water of the river Rhone only, our great limnologist Forel made an estimate of sixty-four thousand years for the duration of the Lake of Geneva. The results of my own detailed studies show that rivers carry much more mineral matter than was supposed hitherto. I have thus come to the conclusion that the Lake of Geneva, the largest in Switzerland, will probably not last more than thirty-two thousand years, that is half the figure admitted by Forel. Do not think that all our Alpine lakes, as well as the artificial lakes now contemplated, will have a similar duration. It will be sufficient if I give you the instance of an artificial lake of one million cubic metres volume which has been completely silted up in fourteen years ; this shows that there are cases—especially when

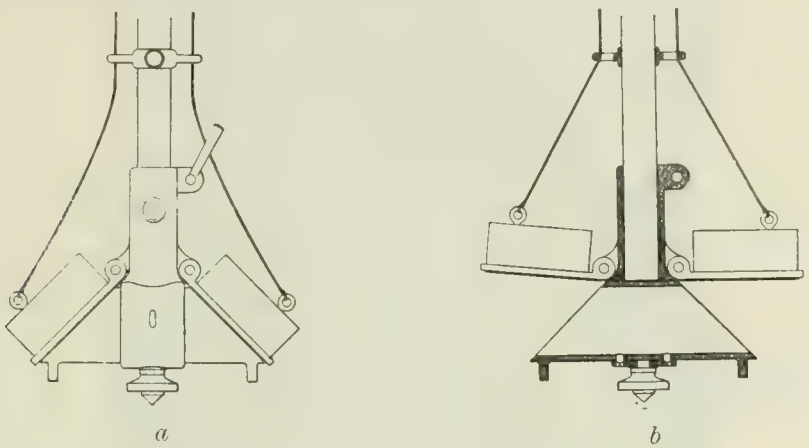


FIG. 5.—Apparatus for obtaining samples of river-water from any depth—*a*. open, *b*. shut.

the volume of the lake is small relatively to the volume of the river—when the life of a lake may be very short. The geological constitution of the catchment area plays also an important part.

From the purely scientific point of view the study of the drifting of alluvium in streams permits of an estimate being made *of the total ablation at the surface of a basin*. I have come to the conclusion that in the Alps ablation is more considerable than was thought hitherto : *it may reach from one-half to one millimetre a year.*

III. The Mode of Formation of Alpine Lakes.

From the point of view of their mode of formation, lakes must be classified on the basis of their origin, and not, as has been done by several authors, merely on the question whether they are rock basins or barrier basins. The Swiss lakes may be classified as follows :—

1. Tectonic lakes.
2. Lakes produced by glacial erosion.
3. Lakes due to phenomena of solution in calcareous rocks.

4. Lakes at the foot of a glacier.
5. Lakes due to hollows surrounded by water bearing strata.
6. Barrier lakes.

1. *Tectonic Lakes.*—These are related to fractures of the earth's crust rather than to folding. The tectonic lakes of Switzerland are not numerous. The most general case is that of a horizontal displacement, perpendicular to the axis of a stream. Fig. 6 is a map of the Lake of Joux, which occupies the bottom of a syncline in the Jura range. To the north and to the south of the lake we have a mountain chain constituted by an anticline. If you follow the chain which borders the lake to the south, you will see that it soon and sharply changes its

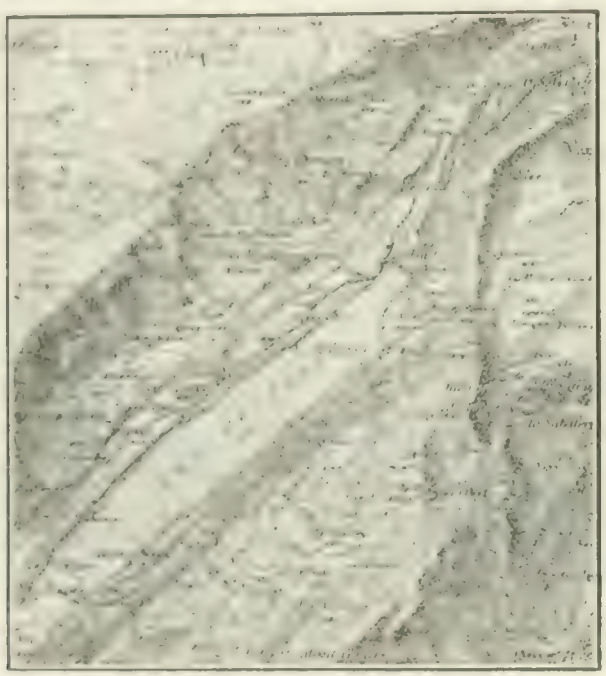


Fig. 6.—The Lake of Joux in the Jura Mountains, a tectonic lake.

direction, completely blocking the flow of water in the valley, so that the lake results.

2. *Lakes due to Glacial Erosion.*—As far back as 1862 Ramsay published a paper entitled "On the Glacial Origin of certain Lakes in Switzerland, The Black Forest, Great Britain, Sweden, North America, and Elsewhere." This paper dealt especially with certain sub-Alpine lakes, and the lakes of the northern hemisphere were treated of in a general way. Ramsay held that the greater part of the rock basins in regions formerly glaciated were due to the erosive action of glaciers. Thus he maintained then that the lakes of Geneva, Thun, Brienz, Lucerne, Zurich, Constance, and Wallenstadt were due to glacial erosion and not to orogenic movements. He also drew attention to the fact that in Europe, as in America, the number of lakes increases northward.

Since these northern regions have been glaciated, it is possible to regard glacial action as accounting for a great number of these lakes.

Ramsay's ideas were not accepted, and the glacial erosion theory passed through a long period of neglect. From the study of modern glaciers the geologists and geographers of the Continent, following the example given by Albert Heim, denied all glacial erosion. In Scotland, on the other hand, geologists, among whom I may cite Dr. Peach, Dr. Horne, Sir Archibald Geikie, and James Geikie, see glacial action in most of the Scottish rock basins. In the Alps Heim has tried to develop

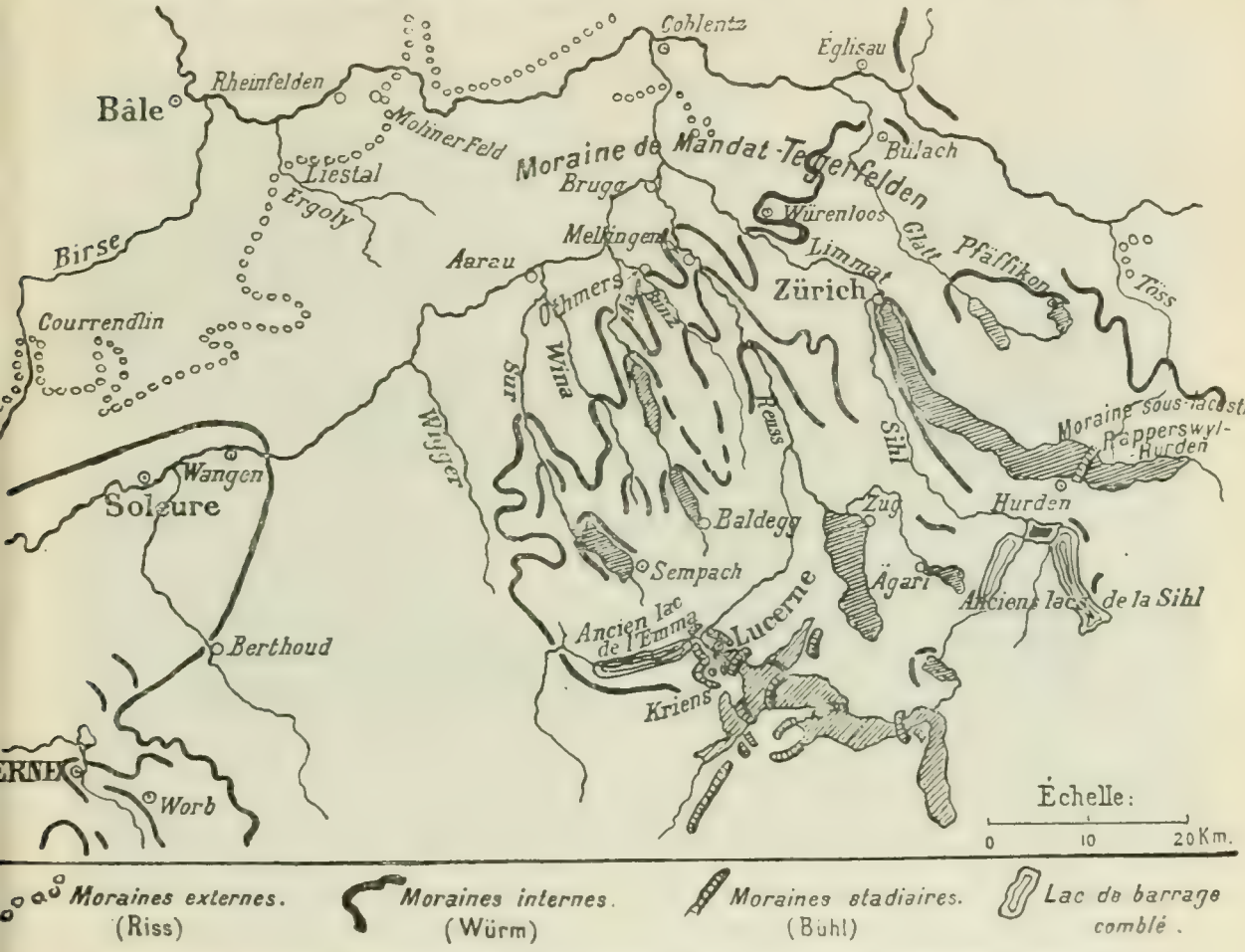


FIG. 7.—Relations between glacial deposits and hydrography in Switzerland, after Penck and Brückner in Girardin.

an idea formulated in 1864 by Lyell, according to which the great sub-Alpine lakes of the northern as well as of the southern side of the Alps are due to subsidence. From his study of the Lake of Zurich the master of Alpine geology declares that the lakes of the border of the Alps have been produced by a subsidence of the Alpine *massif*—the counterpart of this gigantic act of surrection.

It is to the Scottish school under Drs. Peach and Horne, and to the American school under Professor Davis, that we owe modern ideas of the importance of glacial action. This example has been followed on the Continent by Professors Penck and Brückner. At the present time,

of all the Swiss geographers and geologists, Heim is the only one who will not admit that the great lakes at the foot of the Alps were formed by the action of glaciers.

The sketch-map which forms Fig. 7 indicates the important part played by the ancient glaciers in the hydrography of the northern border of the Alps. We have had in Switzerland five glacial periods. The extremity of all the great lakes corresponds with a belt of frontal moraines, belonging either to the greatest extension of the last glacial period or to one of the phases of retreat of that period. These lakes, situated at the foot of the great Alpine valleys, occur on the site of the terminal basins of the ancient glaciers. On account of their rocky basins they belong to the series of lakes due to glacial erosion, while their belt of

Photo, Ad Astra Aero.

Fig. 8.—The Lake of Brienz, scooped out by an old glacier.

moraines also connects them with barrier lakes. We can do no more than confirm the views expressed in 1862 by Ramsay regarding these lakes.

The photograph, taken from an aeroplane, which forms Fig. 8 shows the Lake of Brienz—a splendid example of the kind of lake just referred to. It is really impossible to explain the formation of its basin otherwise than by glacial erosive action; its floor is very flat and regular, and its sides are very steep. The valley at the extremity of which the lake is situated possesses also all the characteristic features of a splendid glacial valley. If, starting from the foot of the Alps, we go up the main valleys towards the interior, and thence enter the tributary valleys, we soon come across other lakes, smaller than those just mentioned, but all due to the erosive action of the vanished glaciers. Among these lakes are those lying in basins due to glacial hollowing-out on the site of ledges of the thalweg of pre-glacial streams. The lakes of the Grimsel

Pass, in the upper part of the Aar Valley, result from this process. Fig. 9 shows two alluvial plains which represent ancient lakes filled up by alluvium. The highest limit reached by the ancient glaciers is clearly visible.

Let us pass next to Corrie lakes. Corries are receiving basins of pre-glacial torrents, deepened by glaciers. Their floor, after the retreat of the glacier, is generally occupied by a lake. This lake has a rocky basin, and is often supported by a frontal moraine. In the Highlands a great number of lakes belong to this type.

The hanging valleys, that is to say, the ancient glacial tributary

Work lent by the Swiss Hydrographical Survey *Photo by Mettler.*

FIG. 9.—The Lakes of the Grimsel.

valleys which opened into the principal valley above the level of its glacier, often possess at their lower end a rock-basin lake. Lake Ritom belongs to this type. It occupies a hanging valley above the principal valley of the Tessin, on the southern side of the Alps. This lake was studied by Professor Garwood in 1906. Since it is situated at the point of contact between gypsiferous Triassic rocks and gneiss, its origin, according to Garwood, is mainly due to the solvent action of surface water on the gypsiferous rocks. However, if we make a close study of the bathymetric chart of Lake Ritom, we perceive a flat floor and steep slopes, that is to say, the essential characteristics of a lake of glacial erosion. Yet we must admit the existence of two small, shallow basins,

Photo by L. W. Collet.

FIG. 10.—Lake Riton.

Photo by L. W. Collet.

FIG. 11.—Glacial Striæ at Lake Riton after the lowering of the lake-level.

which appear to point to chemical solution. To my mind, Lake Ritom must owe its origin both to the solvent action of water on more or less soluble rocks and to glacial erosion. The action of the glacier was the last to intervene, and the floor of the basins has been rendered impervious by the deposition of the ground moraine.

Fig. 10 gives a general idea of Lake Ritom. To the left are two corries, each occupied by a small lake. With the view to using the volume of water included between the zero level and the level of thirty metres, Lake Ritom has been pierced by a tunnel at the latter depth. This will regularise the output of its outflowing stream during winter, and thus feed the power plant which is to provide electricity for the St. Gothard Railway.

The resultant lowering of the lake-level has enabled me to make some interesting observations, which are brought out in the following photographs. The gneissose sides of the lake have been bared, and on them glacial action is self-evident, as shown in Fig. 11. The glacial striae preserved under the water are remarkably fresh. *They are markedly inclined upward, which proves glacial erosive action.*

The rocky barrier of the lake (Fig. 12) also bears glacial striae, and is in places covered over by morainic materials. The lowering of the lake-level has, moreover, permitted of the photographing of the structure of a delta, thanks to the erosion produced by the lowering of the base level of the tributary stream.

Fig. 13 shows the constitution of the horizontal layers of the delta, in which the black layers are peaty, while the white ones are made up of calcareous sands. Moreover, disturbed equilibrium, following on the lowering of the lake-level, has led to landslips in all the deltas of the tributary streams. These deltas were made up—as shown in Fig. 14—of sands and fine clays impregnated with water. When they were no longer supported by the pressure of the lake water, slipping resulted. One single delta has remained intact (Fig. 15). It is made up of very coarse elements, and the water of impregnation was enabled to disappear *pari passu* with the lowering of the lake-level without disturbing the equilibrium.

Among the lakes due to the erosive action of glaciers we have yet to cite the small lakes found within *roches moutonnées* (Fig. 16). These lakes, like those on the St. Gothard Pass shown in this photograph, occupy hollows between the *roches moutonnées.* They are small and shallow, and their waters are derived from the melting of snow during spring and from the rain during summer. Many of the small lochs of the Highlands and of the Hebrides belong to this category.

3. *Lakes due to Phenomena of Solution in Calcareous Rocks.*—These lakes may be of two kinds, according as to whether they occupy a "doline" or a "polye." Doline is the name given in the region of the calcareous ranges of the Balkans to a closed depression, more or less elliptical in shape, sometimes with a flat floor, muddy or pebbly, sometimes leading to a hollow more or less deep, or even to a real well. Most of the

Photo by L. W. Collet.

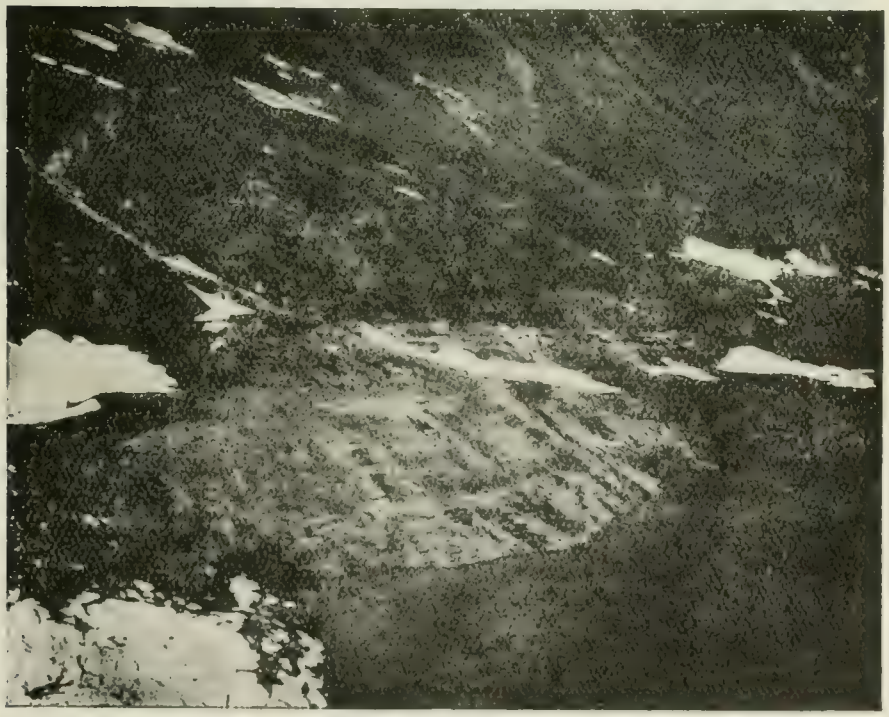
FIG. 12.—The rocky barrier of Lake Ritom, after the lowering of the lake-level.

Photo by L. W. Collet.

FIG. 13.—Cutting through a delta at Lake Ritom.

Block lent by the Swiss Hydrographical Survey. *Photo by L. W. Collet.*

FIG. 14. –Landslip in a delta at Lake Ritom, after lowering of the lake-level.



Block lent by the Swiss Hydrographical Survey. *Photo by L. W. Collet.*

FIG. 15.—A delta that has remained intact after the lowering of the level of Lake Ritom.

From a T. H. Colvin.

Fig. 18.—The lake on the St. Gothard Pass.

of the dolines, that is to say, of the funnels constituting the lake basin, the corrie glacier deposited its ground moraine, which has closed the fissures of the limestone.

In order to take the soundings, a boat had to be carried by labourers from the valley, the path being impracticable to mules. The lake is seldom free from ice in summer, and though, by means of the boat, it is easy to take soundings in the ice-free part, it is very difficult in the ice-covered areas. Since the ice is in a melting phase it is impossible to work on it as one would in winter when the lake is completely frozen.

FIG. 17.—Reduction of the bathymetrical map of the Lake of Mutten, surveyed by W. Stumpf of the Swiss Hydrographical Survey.

To avoid accidents the boat was hauled over the ice, and the soundings were taken from it. Had the ice broken, the men were in no danger, since they were in the boat. In order to haul the boat, the men walked on a ladder, so as to distribute their weight. The sounding of the ice-covered part on account of these difficulties took a long time: a month's work with four men.

Let us now consider Lake Seewli (2000 metres), in a corrie above the Reuss Valley. The view (Fig. 18) is taken from above downward. In the foreground is the alluvial flat created in the lake by the main stream. The lake occupies a doline, and the water disappears in the fissures of the limestone on its sides (Fig. 19). The water reappears

Photo by L. W. Collet.

[illegible] (T, T1) to 61 fissures, in which the water disappears.

[illegible] L. W. Collet.

[illegible] (T2, T3).

as springs 1500 metres lower down the valley. I proved this by pouring five kilogrammes of fluoresceine into the fissures and finding the green colour in the springs twenty-two hours afterwards.

Let us now pass to the category of "polye" lakes. By polye is meant a depression in the limestone, much larger than the doline, related to an ancient valley in the fissures of which the stream has disappeared.

Lake Seelisberg (Fig. 20) is a fine type of polye lake. It occupies the bottom of an ancient valley of which the outline is seen in the background of the photograph. It lies above the Lake of Uri, at an altitude of 700 metres. The stream which once flowed along the old valley must have disappeared at an early date, owing to the presence of numerous faults in the limestone. The deepening of the basin by solution and subsequent subsidence must have progressed rapidly, because the catchment area of the stream was small. The floor of the present lake is impervious. It must certainly have been covered with ground moraines. The neighbourhood of the lake, though it is covered with vegetation, displays evident traces of chemical erosion, appearing as depressions. At about two hundred metres from the lake the outflow is lost in the vegetation-covered ground, which suggests fissures in the subjacent limestone. After removal of the vegetation a huge fissure was laid bare, which demonstrates the importance of subterranean chemical action in limestones. I tried to determine the place where the water reappeared as springs, and used for that purpose ten kilogrammes of fluoresceine. Twenty-nine hours later the green colour appeared at a depth of 3 metres in the Lake of Uri, 400 metres below Lake Seelisberg. The reappearance of the water is due to the presence of impervious layers of clay underlying the limestone. A detailed geological study of the region had shown that it would be probable that the water would reappear at this spot.

4. *Lakes within Ice.*—Any one who has traversed glaciers must have come across small lakes which are the result of the accumulation of water in depressions at the surface of the ice. There are several of these on the Gorner Glacier, near Zermatt. The most important are generally to be found at the junction of two glaciers. It happens frequently that a large crevasse may be filled with water, and thus form, so to speak, an intraglacial lake. The volume of water may be very large. If the crevasse full of water were to open right down to the floor of the glacier, an outburst would be the result, that is, the lake would empty itself almost instantaneously, the sudden inrush of water in the valley causing serious floods.

5. *Lakes due to Hollows surrounded by Water-bearing Strata.*—The lakes of this category are characterised by the fact that they have neither tributaries nor visible outlets; they are of small dimensions. The lake basin is entirely in fluvio-glacial alluvium, that is, moraine materials that have been washed out by the stream escaping from the

Block lent by the Swiss Hydrographical Survey.

Photo by O. Lutschg.

FIG. 20.—Lake Seelisberg.

Block lent by the Swiss Hydrographical Survey. *Photo by O. Lütschg.*

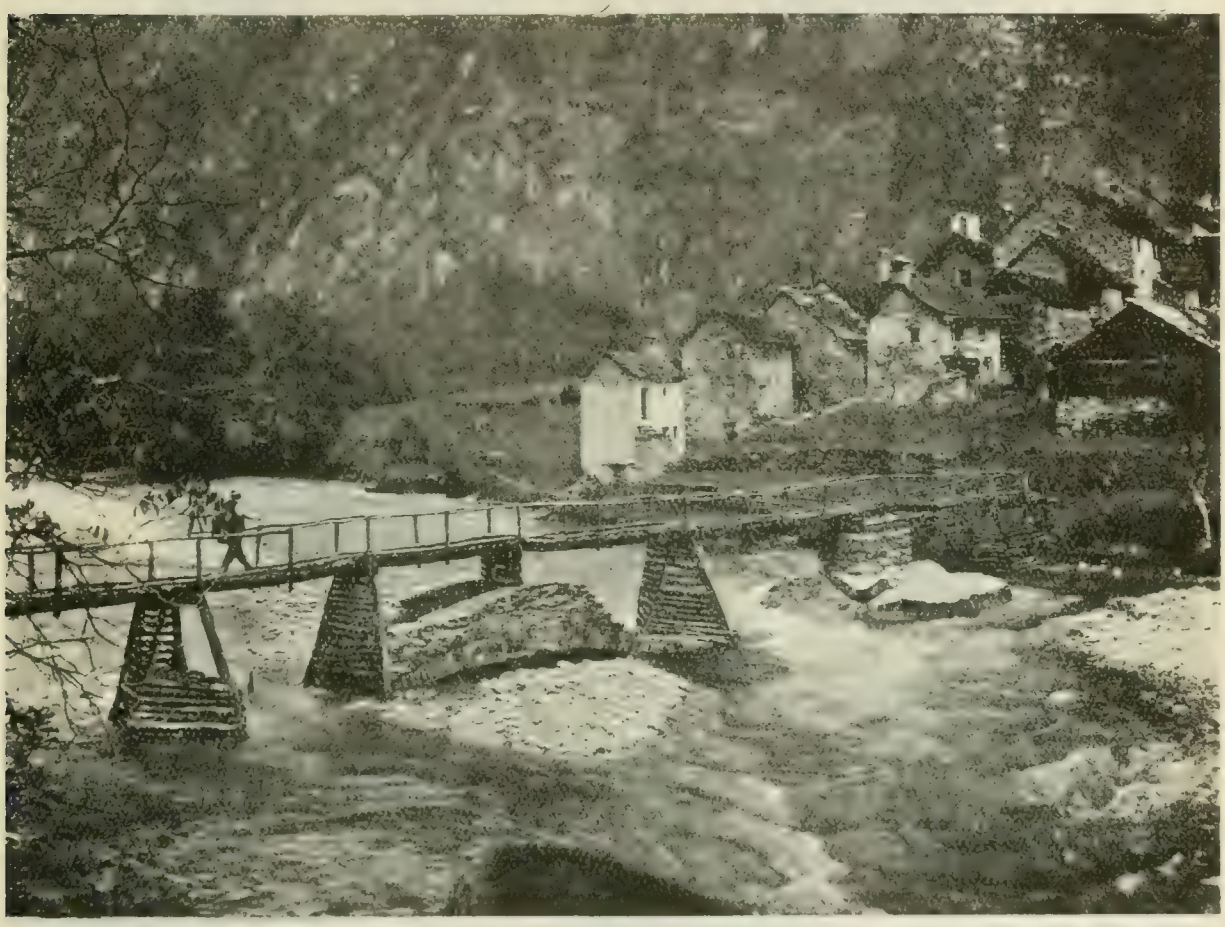
FIG. 21.—The Lake of Les Brenets on the river Doubs, a barrier lake, at high water. The two hills in the background represent the two landslips which produced the lake.

Block lent by the Swiss Hydrographical Survey. *Photo by O. Latsche.*

FIG. 22.—The bottom of the Lake of Les Brenets after a long period of summer drought in 1906.

glacier. The basin may be due to a lobe of ice being left behind during the retreat of the glacier. Alluvial matter was deposited around it, and the present lake basin results from the melting of this ice lobe. Its floor is at a lower level than the level of the underground water which circulates in the alluvium. In Denmark these lakes are called "Sölle." We have several of them in Switzerland, but their true nature has been recognised only recently.

6. *Barrier Lakes.*—We will pass now to the Barrier Lakes, which



Block lent by the Swiss Hydrographical Survey. *Photo by L. W. Collet.*

FIG. 23. -The river Bavona.

play a great part in scenery. There is first of all the case of the barrier due to a landslip across a stream. An interesting instance is displayed by the Brenets Lake, on the river Doubs, in the Jura. The barrier which has produced the lake is due to two landslips (Fig. 21). At low water the water of the lake flows through the landslip, while at high water there is a superficial outflow. The difference of level between high- and low-water mark is about twenty metres.

In 1906 there was a long period of summer drought in the Jura. The springs became nearly dry, and the lake-level was lowered to such an extent that in certain places the floor emerged, as shown on Fig. 22. The bank on the left shows the normal lake-level. The small stream

flowing on the lake bed—which is dry and traversed by desiccation

Photo by L. W. Collie.

Fig. 24.—The Lake of Mattmark and the lateral moraine of the Allalin Glacier with a peak in the principal valley.

Fig. 25.—The Lake of Mattmark in 1868. A lobe of ice occupies the cutting in the moraine on the right.

seaward in the mud—represents the river of which the ponding back further down forms the lake.

The formation of a lake through the ponding back of a principal stream by the alluvium of a tributary is rather rare. It is, however, occasionally met with in the Alps at times of excessive spate. At such times the torrents carry enormous quantities of alluvium, which add largely to the size of the cones of detritus. Fig. 23 shows the river Bavona, on the southern slope of the Alps. In 1903, during a period of spate, an enormous amount of material was brought in below this bridge by a tributary torrent. The new cone completely ponded back the principal valley, with formation of a lake $2\frac{1}{2}$ metres deep, which became filled up within a few weeks by the alluvium of the river

Block lent by the Swiss Hydrographical Survey. *Photo by L. W. Collet.*

FIG. 26.—The plain of Mattmark divided into two parts by the moraines of the Schwarzenberg Glacier.

Bavona. The bridge which linked the two banks disappeared under the alluvium, and the piles of the new wooden bridge rest on the arches of the old stone bridge.

We will now consider the case of a lake due to the ponding back of a principal valley by the moraine of a tributary glacier.

The Lake of Mattmark, in the Saas Valley, may be taken as an example.

Fig. 24 shows what is left of this lake, also the moraine of the Allalin Glacier and the cutting through which the stream emerges from the plain. Looking at the photograph, one is led to think that the lake once reached the higher level of the moraine and that it gradually hollowed

Photo by O. Lütschg.

FIG. 27.—The Lake of Marjelen.

Photo by O. Lütschg.

FIG. 28.—The Lake of Marjelen at high water mark.

out its bed in the moraine, with a lowering of its level, while at the same time it was being filled up by alluvium. This explanation is not satisfactory : the old chronicles of the Saas Valley state that the valley was several times devastated by violent outbursts from the Lake of Mattmark. I had not arrived at an explanation of these outbursts until I came across an old photograph showing the lake still full and the Allalin Glacier larger than now. A lobe of ice occupies the cutting in the moraine, and the outbursts are thus explained. The lake was held in by the moraine and the ice lobe, and crevasses in the ice would let the lake water out at a more or less rapid rate (Fig. 25). Such outbursts happen in the case of the Lake of Märjelen, to be considered later.

On Fig. 26 we see two alluvial plains. The lower plain represents

Photo by O. Lütschg.

FIG. 29.—The Lake of Märjelen empty with the icebergs left on its floor.

the Lake of Mattmark, and the higher a second lake quite filled up by alluvium. Therefore a glacier, now in retreat, formed this second lake : it is the glacier of Schwarzenberg.

We will now pass to the Lake of Märjelen, belonging to a type of lake due to the ponding back of a tributary valley by the glacier of the principal valley. Fig. 27 is a view of the Lake of Märjelen. The great Aletsch Glacier looks as if it were entering into the lake. The white line on the right shore is an old shore-line corresponding to a higher level of the lake.

In the Märjelen Valley there are now two lakes. One is a rock basin, while the second one is held in by the Aletsch Glacier. The presence of the old shore-line proves that formerly, when the level of the glacier was higher, there was one lake only.

Fig. 28 displays the margin of the glacier when the lake is at high-water mark. The view illustrates the mode of formation of icebergs. The ice is lifted upwards by the pressure of the water and then breaks: in polar regions the same thing happens when glaciers reach the sea. The Lake of Marjelen may empty itself in three different ways. If the

Photo by O. Lütschg.

Fig. 30.—The ice wall, 180 feet high, when the Lake of Marjelen is empty.

ice barrier is free from fissures or crevasses the lake flows over the glacier at its lowest point. This is seldom observed, as the ice generally breaks and the lake may then empty itself gradually. Again, the emptying of the lake may be due not to fissures and crevasses at the surface, but at the base of the glacier. In such cases the lake empties itself very rapidly in an outburst (Fig. 29). The water flows under the Aletsch Glacier

and reaches the Rhone Valley, and the sudden addition to the volume of the river Rhone may lead to floods. When the lake empties the icebergs are left on its floor. Fig. 30 shows the ice wall, 60 metres high, which holds the empty lake.

Lakes of the Märjelen type are at present rare in the Alps, and my object in arranging for a detailed study of the Märjelen Lake[1] was to obtain a full account of this type of lake, which was common in Switzerland during the Great Ice Age.

GEOGRAPHY AND PROGRESS IN INDIA.[2]

By the Right Hon. Lord Meston, K.C.S.I., LL.D., V.D.

Scotland has given so many of her sons to India that there is much of profound interest to her in our great Dependency, whether in its romantic past, its puzzling present, or its enigmatic future. Speaking to the Scottish Geographical Society, therefore, I make no excuse for choosing as my topic the influence of geography on the evolution of India. "In no country in the world," says Sir Thomas Holdich, "has geographical position relative to surrounding continents and seas shaped the history and the destinies of a people more surely than in India." With this as a text I propose to consider briefly the long story of India and to conclude with a rapid glimpse into its future; eschewing carefully the controversy which is now raging over its political situation.

I. India's Geographical Isolation.

India, as you know, is a sub-continent tapering into a vast peninsula; it is rooted in the heart of Central Asia and thrusts its giant bulk into the tropical seas. On one hand it looks out upon the shores of Africa; on the other it gazes across the rich archipelago which links up China with Australasia. From Karachi at the entrance of the Persian Gulf, round the coasts of Bombay, Madras, and Bengal, for nearly 3000 miles, it is protected by an ocean which is lashed by monsoon and cyclone, the transit of which was full of danger to the old-time sailing vessel.

On its land frontiers India's defences are still more formidable. On the far north, beyond the lovely vale of Kashmir, is that tumbled mass of lofty ranges and steppes known as the Pamirs, and often described as the Roof of the World. Along the north-east boundary lies the elevated plateau, with its salt lakes and its devastating icy

[1] O. Lütschg, "Der Märjelensee und seine Abflussverhältnisse," *Annalen der Schweizer. Landeshydrographie.* Berne: 1915.

[2] An Address delivered to the Royal Scottish Geographical Society in Edinburgh on December 15, 1921.

world of that kind of mystery). Effectively veiled from the sight of the world by mountain ramparts on either side. Its defence on the Indian front is the greatest mountain range in the world, the Himalaya, whose towering wall of perpetual snow is pierced by rare and hardly accessible passes. Leaving Tibet, the Himalaya sweeps round to the ocean in sharp unbroken ranges, in which some of the famous rivers of China have their rise, and which are covered with forests whose miasma is singularly fatal to human life. The approach to India is thus effectively stopped from Kashmir on the north to Assam on the east. But if we turn west from the Gauhty mouth of east, we still find ourselves in wild mountainous country, the Hindu Kush and its neighbours, until working down through the savage scenery of the Afghan border we reach the lower lands which run to meet the Persian Gulf. These, however, are hardly less forbidding than the heights, for they are commanded by the waterless deserts of Baluchistan, the inhospitality of which is eloquently expressed in the local proverb to the effect that when God built the universe He left the rubbish in Baluchistan.

The first influence which its geography thus had on India just before the dawn of history was to isolate it completely from the rest of the ancient world. What associations its inhabitants had in earlier geological epochs with other branches of the human race it is idle to speculate. There are evidences that India was once joined to Africa by a great continental area, long submerged and now visible only in Madagascar and such island groups as the Maldives and the Seychelles. But this land bridge began to break up, it would appear, in the Jurassic period; so that it would be unsafe to base upon its former existence any conjecture as to affinity between the Indian aborigines and the black races of Africa, in spite of the rate at which the antiquity of man is being advanced by fresh discoveries. That India, however, was once widely populated by men short in stature and almost coal-black in colour may be judged from the patches of primitive tribes which still survive in the unreclaimed jungles of the more ancient uplands. That at a very remote epoch they were overrun by emigrants of unknown origin, but of Dravidian race, who occupied all the richer areas, and acquired wealth and built fortified places, seems fairly certain. But, whoever peopled it, the India which was contemporaneous with the older civilisations of the Nile valley and Mesopotamia was clearly not, like them, in touch with the outer world, hardened by war and polished by contact with other nations. Hemmed in by ocean and mountains, the prehistoric people of India appear to have remained low in the scale of human advancement; and as our story develops, we shall find that this handicap was never fully overcome.

II. THE ARIAN PENETRATION.

In the long line of defences with which Nature has endowed India the weakest point, as we have seen, is in the north-west, where the

mountains come down out of the clouds to run along what we may for brevity call the frontiers of Afghanistan. In this maze of precipices and ravines there are certain well-known passes leading from what the maps now call Asiatic Russia into the frontier provinces of India. How intractable at their best are these openings in the mountain wall will be recognised by any one who has ever seen the frowning battlements of the Khyber. And yet, despite all their dangers and hardships, these passes, particularly the Khyber, Kuram, Tochi, and Gomal, were for many centuries the only highways between India and the rest of the world. They began to be trodden at a time long before the Phœnicians sent their galleys creeping round the coast of Arabia to explore the land of Ophir: and their use continues to this hour. By far, however, the most momentous of the countless hosts who, as friends or foes, explorers or traders, have traversed them and strewn them with their dead, were the tribes of Aryan speech who migrated from High Asia towards the warmer south between four thousand and five thousand years ago. The details of this wonderful trek are the battlefield of scholars; but we may take it that the distant predecessors of Saxon and Teuton and Gael—of all the chief white races of Europe to-day—occupied in the twilight of the world the vast spaces east of the Ural mountains, where they flourished and multiplied exceedingly. They were pastoral folk, and to some extent at least were nomadic: wandering from time to time, with their light ploughs across their shoulders, in search of streams and fresh pastures for their flocks. The family was their only unit, and their gods were the dominant forces of Nature—the sun, the rain-cloud, and the tempest. How it was that whispers of the wealth of the fertile plains of unknown India reached this patriarchal people we shall never know. But long before Solomon reigned or Troy fell or Rome was founded, tribes of this ancient stock began to wander laboriously from the cradle of their race. There are traces of their having reached Malatia of the Hittites in Asia Minor. They possessed the tableland of Persia. But their greatest adventure was the penetration with their children and their tents and their herds, first through the forbidding gateways into what we now call Afghanistan, and thence through the wild passes into India. It must have seemed the very garden of the Lord as, worn with years of wandering, they debouched from the cruel hills into the plains through which the Indus pours its fertilising stream. And so these simple and courageous folk parted finally from their brethren whose blood flows in our veins, and passed into the land where they were to found the oldest living religious and social system in the world, Hinduism. These wanderers came, not in one solid mass, but in a long-continued succession of incursions which perhaps ranged from between 2400 and 1500 B.C.

Out of the mists of this dim antiquity, the only story that we can piece together clings to the instinct for race purity, an instinct elemental at all times but subsequently elevated by the incomers into the keystone of the whole fabric of Hindu life. The younger tribes who followed the

first pioneers seem to have disobeyed injunctions such as Joshua gave on his deathbed to the children of Israel in very similar circumstances. They made treaties and marriages with the people whom they found in the country. Against this the augur of the descendants of the earlier settlers was kindled, and they struck their tents and drove off their herds eastwards through the modern Punjab, until they reached that rich plain which stretches from Delhi to Benares, and is studded to-day with great and ancient cities and the shapeless ruins of cities older and equally great, marking the original Hindustan, or land of the Hindu. Here they settled, and here the veil of India's isolation closed upon them. In their zeal to separate themselves from their brethren who had "bowed down before the gods of the Amorites," the descendants of the earlier stock had removed yet another of the great geographical barriers which have shaped India's destinies. The Punjab, which the skill and devotion of British irrigation engineers have now converted into one vast granary, fertilised by a network of canals, was then largely a tract of arid jungle: and wide areas of Rajputana were, and still are, deserts of sand and thorn. The earlier Aryan immigrants had forced the passes and opened the Gates of India for all time. But in the Gangetic plain they had reached a position where Nature enfolded them safe against the intrusions of the outer world, while they developed—as they now for centuries proceeded to do—the literature and philosophy, the life and faith which constitute the marvellous structure of Hinduism.

The Gates of India had indeed been opened. Through them there now poured intermittent waves of invaders, friendly and otherwise, right down from the first Aryan discoveries to the Christian era. Arabs came in, the mighty kingdom of Babylon sent its emissaries, and when the Persian Empire grew into the strongest military power in the East, under Xerxes and Cyrus and Darius, it appears to have counted Afghanistan and the Indus valley among its provinces. Trade sprang up; and the precarious routes of the land caravans were supplemented by the even more precarious highways of the sea. The Phœnicians, most enterprising of all ancient races, sailed regularly from Akaba, at the head of the Red Sea, to the mouths of the Indus. You will remember how Solomon commissioned his ally, Hiram of Tyre, for such voyages. Hiram was three years over each of them (they would now take about three weeks); and he used to bring back gold and silver, apes and peacocks, ivory and sandalwood, for the adornment of Israel's gorgeous court. In war, as well as in peace, the dwellers in the Indus valley got entangled in international relations. Herodotus describes how Indian archers, clad in cotton, as they would be to-day, fought in the ill-fated expedition which Xerxes led against Greece. But Greece was not always an enemy: trading colonies of Greeks settled in the heart of the border lands, and Bactrian kings, who carried on the Greek traditions, subsequently became overlords of the north-west frontier. The cultivator in some remote village in northern India will still bring you, if you are interested in such matters, a handful of coins which he has turned up

with his plough; and there is often a chance, when you have washed away the traces of their long sepulture, that you will find one or more of them inscribed with the name of some forgotten satrap, in Greek characters, and the title of *βασιλεὺς βασιλέων*, King of kings, or more frequently, of *βασιλεὺς σωτήρ*, king and saviour.

In this welter of constant invaders and changing dominion, the campaigns of Alexander of Macedon were but an episode, though we know it as one of the highest efforts of military genius in history. After the defeat of Porus with his elephants and chariots, in 326 B.C., it had been the apparent intention of the great Macedonian captain to push eastwards into the heart of India, and it was only the refusal of his weary veterans to cross the river Beas that deflected him. The impact of Hellenic civilisation upon the stronghold of Hinduism before that faith had finally consolidated might have had momentous results; but such was not to be, and Alexander turned to explore the Indus to the sea, ultimately returning to Babylon, where he met his untimely death. In the hands of less capable successors all traces of his conquests rapidly disappeared. Greek influences subsisted, under the Bactrian dynasties, till nearly the Christian era; but their only permanent impress was on the art of India, and they left the religion and philosophy of the Aryan Hindus practically unaffected. Even the name of Alexander is unknown in Hindu literature, though to the Persian poets he is the traditional hero of all romance and chivalry.

Hitherto I have been keeping my story in the old world before Christ. Even thus, if we try to visualise the centuries of bloodshed along the Indian frontiers, the countless invasions, and the bewildering mixture of races which must have gone on ever since the later Aryan nomads intermarried with the autochthonous Dravidians, we seem to see the origin of many of the problems of to-day. We understand, for example, why the modern Afghans describe themselves as being of the seed of Abraham, or as "children of Israel," and members of the "lost tribes," although they have long abandoned the Jewish faith. We understand the restless impulse which sends the Sindhi trader to earn his bread in the wilds of Africa, or the Punjabi to drive camels in far Australia. And we realise how it is that life is so cheap on our blood-stained frontier, and how the rough tribesmen prize, and flinch from no murder and no treachery to maintain, the independence which they have preserved through such a history.

III. The Development of Hinduism.

We left the puritan section of the primitive white race which discovered India at the stage when they had parted from their back-sliding brethren on the Indus, and finished their last great migration by settling on the Gangetic plain. In that spacious heritage they were defended by the cloud-capped Himalaya on the north and east, by the deserts of Rajputana on the west, and on the south not yet by the

ocean, which they had never seen, but by the stretches of low hill and dense forest which separate the north of India from the peninsula proper. To the last of those barriers I shall revert again; for the present it is enough to say that for many centuries it checked all movements southwards and completed the chain of natural walls within which the next act of India's drama was to be developed. It was the geographical features which made the story what it is; for, encompassed by these walls and debarred from all communion with the rest of the world, the "Middle Country" (as it was called) evolved for the whole of modern India a civilisation of a type entirely different from any other in the records of mankind. Its fruits are Hinduism and Buddhism, which between them form the rule of life to-day for 350 millions of the human race. Hinduism remains enthroned where it was cradled. Buddhism, its defeated rival, has long fled from its original home to the Further East, to Burma and Ceylon, Siam and Java, China and Japan, whence pilgrims come to worship at the shrines in Upper India which mark the scenes of the Buddha's life and teaching and death.

I have ventured to call this period of evolution an act in the drama of India's history; and it is no more, though it occupied close on 2000 years. In the time at my disposal, however, I can describe it only by sketching, in rapid succession, a few of its leading scenes.

The first scene is the life of the early Aryan settlers at the time when the oldest Indian scriptures, the Vedic hymns, were collected. Though several of those hymns must date from vast antiquity as bardic traditions, the compilation was made between 1500 and 1200 B.C. It portrays to us a free, spirited people, with the rites and customs and patriarchal organisation of their wandering forefathers not yet materially changed by the conditions of their new home. They ate meat and drank wine and rejoiced in games and tourneys. Their women were free and their interests chiefly pastoral. Their major gods were still the great powers of Nature, and were worshipped with sacrifice and elaborate ritual. Their troubles had not yet begun, and the iron hand of the Indian climate had not grasped them.

My second scene would show the patriarchal rule slowly yielding to a larger organisation of society. The tribe had to be knitted more closely, in order to cope with the people of the land, who were probably resenting the reiving habits of the newcomers. It appointed its own leader or Raja; and for his success in war a priest had to attend him and perform the proper sacrifices. The rule of life—its discipline perhaps in face of growing hostility of the aborigines—got more rigid; the conflict of colour had begun.

Then I would shift the scene to a later period, when the virile Aryan had asserted his sway over the older residents, and was relaxing towards them. Intermarriage had become the problem which it has continued to be all through the ages; and the wiser heads were busy with devices for preventing the ruling white race from being absorbed by the surrounding multitudes of a lower civilisation. This brought India, little though

they suspected it, to the crisis of her fate ; for the solution of the problem which the Aryans adopted was the principle of Caste. In the idea by itself there was nothing disturbing. Plato describes his ideal Athens of the heroic age as comprising three castes—"the artisans, the husbandmen, and also a warrior class originally set apart by divine men." But in India the underlying conception was not so much an orderly classification of the citizens as a permanent segregation of different functional groups, and it degenerated into an arrangement of society which hampered progress and stereotyped the accidents of birth. It also operated to exalt the priestly caste, the Brahmans, into a position of domination over men's souls. They alone could perform the sacrifices ; they and their sons alone knew the ritual which would make the sacrifices effective and propitiate the gods. And thus India, vitalised by no freshening breezes from the outer air, was overcome by the miasma which stifles every country that has ever suffered under an arrogant and ignorant priesthood.

In my fourth scene the priestly ascendency is complete and has achieved its hold over the lives of men which persists to this day. But the Brahmans have purchased their power by heavy sacrifices of the original principle. The white Aryans have mingled freely with the older and darker stock, and the institution of caste, instead of being a bulwark against mixture of blood, has become merely a check on the healthy human desire for advancement. Moreover, to bring the aborigines into the Hindu fold, strange concessions have been necessary. Local chieftains have been cajoled into it by nomination to the warrior caste, in order that Brahmans may be attached to them as ghostly advisers. Masses of local gods have been admitted into the Hindu pantheon, in order to bring their followers nominally within the faith, in reality under Brahman domination. The price of the spread of Hinduism has been the steady assimilation of the old Aryan stock and the adoption into its faith of gross superstitions and barbarisms.

Human nature, however, has a habit of rising above its corruptors ; and my fifth scene would show the revolt of the Hindu mind against the baser elements in its own religion. It has taken many a volume to describe how Hindu thought, weary of the formalism of its amorphous creed, probed for centuries, and is still probing, into the riddle of the universe ; and how, simultaneously with the growth of extravagances in the popular beliefs which the priesthood did nothing to correct, there arose a succession of schools of philosophy which are without parallel in their elevation, subtlety, and daring. After the Vedic times the ineffectiveness of the old Nature gods, and their inaccessibility, and the shifting of men's hopes from altar to altar, induced a reaction against polytheism among thinking men ; and the post-Vedic literature is full of the quest for one God. For a time the incarnation of Krishna seemed to go near the goal ; but Hindu thought has never reconciled itself to the conception of a personal god of a human type, and, despite the sublime beauty of his own particular scripture, the Bhagavad Gita

(translated by Sir Edwin Arnold as the "Song Celestial"), Krishna remains merely one of the most popular of many deities. The needs of the simple human worshipper, however, never sat heavily on the conscience of the Brahman priesthood; and their philosophy now turned in another direction, the omnipresence of God, evolving at a very early stage the idea of a universal being, in the nature of pure thought or intelligence. By its permission, only one other principle existed in the universe, the principle of Maya or deception, which deludes men by dressing up as a phantasm the unreal world of sense. From Maya also proceeds the illusory principle of divisibility, which seems to separate the individual soul from the supreme soul; and through this illusion souls are born and reborn in endless chain, the vast multitude of them without any hope of ever reaching the knowledge which will absorb them into the godhead. For it is only a knowledge of the universal being that can let the soul flow into it, as a river flows into the sea; and yet men go on for æons worshipping gods which are mere illusion, and no part of the divine principle. The infinite variety of this thought is equalled only by its infinite hopelessness, as there was no guide in the Brahman philosophy to the knowledge which would lead to ultimate rest; and it was against this hopelessness that Buddhism arose in protest.

This brings me to my sixth scene. Born in the sixth century B.C., a scion of a noble house, though clearly not of Aryan origin, Gautama Buddha long sought the way of salvation by meditation and penance. The quest was in vain; and at last he cast Hinduism aside, and in the Deer Park near Benares, where his shrines are now being excavated, he preached an entirely new gospel. The search for the Unknown God was to be abandoned; men's souls must at all costs be released from the intolerable burden of endless birth and rebirth; and an eightfold path of right living and right thinking was laid down as the only way by which the evil of existence could be ended and the soul pass into Nirvana or nothingness. Meanwhile all differences of caste were to be abolished; all violence was to cease; and the monastic life was prescribed for men and women who desired to hasten the perfection of their souls for extinction. This in a word was the creed which rose up to rival Hinduism, and exercised a fluctuating influence for close on one thousand years. Adopted by the greatest of India's ancient rulers, Asoka (third century B.C.), it promised in its earlier history to become the national religion. But, in spite of its many theoretical beauties, it failed as a faith in the land of its birth. In the etiolated regions of Indian thought it gradually faded into a religion of inaction, sloth, and formalism; and only when transplanted into newer and freer surroundings did it come into its own. In India it is only a monument of the failure of the finest effort in history to reform Hinduism.

But if any one cause more than another secured the defeat of Buddhism, it was the determined endeavour of Hindu speculation to find a theory of life more helpful to weak humanity; and with this I shall outline the last scene in this particular phase of India's evolution. The

old conception of God as an omnipresent abstract subjective Self was maintained. One school indeed, which now commands probably forty million adherents, deduced from the Vedas a doctrine of dualism, God and his creation apart, a loving God saving his worshippers by grace. But the vast majority of Hindus now follow the other school, the school of monism. For them there is, besides God the infinite soul, no objectivity or reality ; and the end of man is not to worship him as a separate being, but to seek absorption in him. Until that is attained, however, man must be given his illusions—the universe, a God to worship, the whole unreal apparatus of the senses and emotions. Amidst them, if he can sufficiently despise them, he can find a way to salvation, through merit and meditation. Merit, acquired by good works, enables the soul to pass, through its changing bodily forms, ever to higher opportunities, until at last it is purified and fitted to reach the supreme knowledge, and the river flows into the sea.

This is in briefest analysis the fundamental creed of ordinary Hinduism to-day. Unfortunately it has been overlaid by much that is less worthy ; and good works are associated rather with faith and subservience to priestly rule than with conduct, rather with vague idealism than with practical progress. You can see, I think, how the Hindu mind, by constant feeding upon itself, reached a theory which has little relation to practice ; and so I come back to the morbid influences of geographical isolation. Attempts have been made to trace echoes of Pythagoras in Hindu philosophy, just as analogies have been drawn between the Christian narrative and the traditions which grew up round the Buddha. I cannot stop to describe these resemblances ; but no evidence of a real connection has been discovered, and we must conclude that India worked out its own theories of life and eternity, unaided by the criticism of more practical minds or contact with other philosophies. The Hindu ascetic believes that by sitting motionless through life and gazing on his own navel he can attain infinite knowledge. He is a type and a symbol of the decadence which always threatens the Indian theories of life.

The long act through which I have now hurried you, and which upon the stage of history occupied many a century, marked the consolidation of Hinduism and the defeat of its rival creeds within Hindustan proper, that area with the sharp physical limits which I have already defined. But during this period Hinduism had become the State religion of a great temporal power, and with the growth of that power into imperial dimensions it was expanding as well as consolidating. Here again geography directed its course. Its movement generally was first eastward and then southward. Long before the Christian era it had annexed Behar, and the capital of that province to-day stands almost exactly where Asoka held his court. Down the Ganges it advanced without hindrance into Bengal, which later became the leading centre of Hindu orthodoxy and its literature. But to the south it was long blocked by the broad belt of broken country which spans the peninsula between the

Ganges valley and the western sea. The obstacle comprises at least two parallel ranges of hills, the Vindhyas and the Satpuras, with the river Nerbudda flowing in the valley between. The hills are not high; but the dense jungle with which they are covered make them to-day the paradise of the big game sportsman; and in these distant times the forest must have been extensive and pathless.

As barriers against the advance of ancient armies, it is curious to note how much more formidable forests were counted than rivers or mountains or even deserts. In this case the penetration of south India by the Hindus from the north was a slow and chequered process. When at last they did get through in force, they were met by powerful Dravidian communities which had built up a highly developed civilisation of their own behind the Vindhyan screen. The subjugation of the south is a story of which the record is singularly imperfect and confused. In reality it was never completed; and the clash of ideals and faiths led to queer compromises which differentiate sharply the social and economic life of south India from that of the north.

Frazer, quoting a well-known Madrasi scholar, tells how Hinduism overlaid, and never really assimilated, the older organisation. "Learned Brahmans discovered decent Hindu pedigrees for the low but highly serviceable tribes" who were indispensable to them during the period of penetration, and who now pass for high-caste Hindus. Of the labouring classes, however, a large section resisted the Brahman claims, and in punishment they were condemned to be, and are still treated as, so unclean that they may not approach within thirty yards of a Brahman. Their tribal name of Pariya has been adopted into the English language as a synonym for degradation. The consequence of this artificial welding together of society in the south is that the bitter feud between Brahmans and non-Brahmans remains till this day as one of the most serious hindrances to progress in the presidency of Madras—a direct result of the geographical conditions, which prevented Hinduism from flowing into those southern lands while it was still in the adaptive and formative stage of its evolution.

IV. The Later Invasions of India.

Time is short, and it would not be possible to treat the development of India in the last two thousand years with the same detail as I have given to the two thousand years that preceded. Nor for a study in geographical influences is the same detail necessary. It was before the Christian era that India wove its own destiny. Hinduism, as a system governing not only the faith of the people, but almost every incident of their daily life and social relations, had been accepted as the dominant power in the country, and had developed in strict accord with its physical environment. It had been conducting a splendid offensive, rich in its display of superhuman allies, in its appeal to the ignorant populace, in its catholic absorption of backward races, and also in its

philosophic subtleties for the thinking few. It reached its zenith in the centuries just before and after the Christian era. Then came a striking change. Hinduism was forced into the defensive, retiring upon its own involved social structure and the fastnesses of its theocratic rule, to ward off attacks from the outer world.

The first of these was a movement which affected the whole of the early mediæval world, and originated entirely in geographical causes. On this occasion the cause was the drying up of the steppes in Central Asia, and the flight of their inhabitants before the devastation which followed. Vast areas that had once been rich in pastoral wealth, and in cities which were homes of learning and art, disappeared under rolling sand. Their former greatness is only now being unfolded by explorers like Sir Aurel Stein. The unique mystery of this sudden and cruel scourge of Nature remains unsolved; but it accounts for those hordes of blonde fierce horsemen who in the fifth century poured into Eastern Europe and threatened Rome, and who swarmed a little later through the Afghan passages into India. Europe remembers them as the Huns, India as the Hunas. They pressed into the heart of the country, covered the whole of the north with settlers belonging to new Turanian races, and broke up the temporal power which Hinduism had been amassing into an Indian Empire. The political unity for which the Hindu spirit had laboured was scattered by an obscure change in the earth's surface in Central Asia. The Hunas and the other tribes which followed them during the fifth and sixth centuries A.D. have endowed India with some of its finest martial classes and some of its sturdiest cultivators. But their allegiance to Hinduism, effected though it was in time, has not brought any elasticity to the system, and their advent long arrested its development. Worse still, by disintegrating the Hindu power, they split the country into many miniature warring kingdoms, with no habit of cohesion to protect them against the next series of invasions, and the most disastrous of all, to which India was shortly to be subjected.

A new light was now breaking on the world, the blood-red flame of Islam. Sweeping through Asia and converting whole nations by the sword, the Mohammedan crusaders were unlikely to overlook India; and so, once more, the passes gave entrance to a succession of warrior hosts, who continued to harry the unhappy country for centuries. The earlier invaders descended in raids for loot and the lust of slaughter. Listen, for example, to how Vincent Smith describes the annual expeditions of one of those worthies, Mahmud of Ghazni: "It was the custom of the Sultan to quit his capital early in October and utilise the cold weather for his operations. Three months of steady marching brought him into the heart of the rich Gangetic provinces; and by the time he had slain his tens of thousands and collected millions of treasure he was ready at the beginning of the hot season to go home and enjoy himself. He carried off crowds of prisoners as slaves." This was about A.D. 1000. The regular conquest of India began in the twelfth century and reached

its climax in the empire of Akbar, a contemporary of our Queen Elizabeth, and of his successors.

It is not my purpose to repeat this oft-told tale, which indeed is no part of my theme. For my immediate purpose, the chief interest of the Mohammedan period lies in its influence on the progress of India. Akbar built up a mighty empire, not exactly coincident with the British India of to-day, for it included Kashmir, Afghanistan, and tracts in Turkestan, while its direct administrative control stopped to the south a little below the Tropic of Cancer. When that empire fell to pieces, as it did under the later Moguls, what did it leave? An India richer or stronger or with a more developed social system or greater military cohesion than when Islam first took its destinies in hand? Quite the contrary in at least three respects. To begin with, the centralised autocracy of the Delhi emperors had shattered all the earlier groupings of power and forced the Hindu populace to huddle into little local communities for mutual defence. Each community had its own Raja or petty chief, who stood between it and the exactions of the imperial officials; and thus a feudal organisation of society arose out of due time and set back the normal evolution of the country by several centuries.

In the second place, Hinduism had retreated into its own rigid structure, as the only protection against the ruthless savagery of the earlier Moslems and the fierce proselytising zeal of the later. Take the system of joint family property as an example. It was found to reduce the suffering caused by individual losses, whether of life or of possessions; and it hardened accordingly, to the detriment of individual initiative and enterprise. To check conversions to a new faith, the priesthood tightened up the rules of caste and added fresh terrors to the penalty of outcasting. The whole social fabric became less elastic, and the healthy offshoots of a growing organism were crushed.

In the third place, the colony of settlers and converts with which Islam covered the country introduced the problem of sectarian bitterness, which does more, in the present year of grace, to retard the advancement of India than any other single cause. These are some of the legacies of the seven centuries of Mohammedan inroads and conquests. Had the Mogul empire responded to the ideals and maintained the efficiency of Akbar, we might to-day have had a powerful autonomous India, in which Hindu and Moslem had learned to compose their differences and work with a common patriotism. If, on the contrary, the Mogul empire had never arisen, we might have seen Hinduism developing into a great and progressive power, shedding many of its archaisms and anomalies, and moving towards the visions of its better minds. Neither of these things happened; but fortunately for India, geography, after dealing it many cruel thrusts, at last came to its aid.

In 1498 Vasco da Gama discovered the sea route to India. It was the dawn of a brighter day, a day when the old Gates of India would be shut against marauding hordes and savage conquerors; when the new

gates on the ocean would be opened to let India join hands with the free nations of the West; when the isolation which had so long atrophied her would end for ever. But before that day fully broke, the morning twilight was long. The Portuguese, as pioneers, had the first opportunity of bringing peace to India. No opportunity could have been more gravely mishandled; no failure more complete. They still have a Governor-General; but he rules over less than 1500 square miles, a charge smaller than that of the ordinary British district officer. The Inquisition was the chief contribution of Portugal to India's progress, and the mouldering cathedrals of Goa are its only monument.

Then Holland and England came on the scene about the same time, followed by France. With the Dutch our quarrels ended by their sheering off to seek for their colonial empire in the Malay Archipelago. With the French our rivalry was more serious and protracted; but our command of the sea told in the end, and so far back as 1761 the regeneration of India became our task alone. Twelve years later parliamentary control was established over the East India Company. From that day to this we have laboured without respite to heal the wounds of India's tragic past.

Summary and Outlook.

Now let me summarise and conclude. You will say, and say with truth, that there has been more history than geography in my paper. Geography is moderately fixed; history is fluid; and the story of a people who now constitute one-fifth of the whole of mankind is not easy to epitomise. What I have tried to depict to you is this. A country, vast in area, abundantly populated, and rich in natural resources, was for thousands of years accessible only through a few perilous defiles in a nexus of wild hills. Elsewhere it was surrounded by impassable mountains and an ocean full of terrors for the ancient navigators. Within those limits a race of Dravidian stock had lived and organised itself in an atmosphere which we may surmise was one of nature and goblin worship, with all its fears and superstitions. It had no contact with the outer world, none of the stimuli to change and progress which aided the growth of other prehistoric civilisations. Into this stagnant society there burst, over four thousand years ago, an entirely different type of men, the Aryans, with a simpler creed and a loftier outlook on life. The contest between these two was confined, for over a thousand years, to an inner fastness of this isolated land, the area which I have called for short the Gangetic plain. Compromise resulted; the higher civilisation of the white invaders was pulled down more than half-way to meet the lower civilisation of the older majority. There were no sweetening draughts of outer air to help the ferment to work more healthily. The religious and social system of Hinduism was evolved—a system crippled by its artificial devices for keeping the two races

separate, and debased by the necessity of accepting many of the superstitions and barbarisms of the inferior partner.

Meanwhile, on one side of the Gangetic enclave, the north west of India was being filled by a congeries of invaders from all sources—Arabs, Turanians, Scythians, Greeks—who had come down through the passes in search of lands and fortune, and who shook down into a restless mixture with no defined type of culture. On the other flank, behind the Vindhya ranges which sheltered the south of India, the Dravidians maintained their archaic institutions long after those had been profoundly modified in the north; so that when at last Hinduism penetrated into that area, the difficulties of compromise and assimilation had greatly increased, and indeed have never been fully surmounted.

Then about one thousand years ago, through the same narrow landward gates, Islam thrust in a continuous succession of military adventurers who ultimately, after indescribable bloodshed and suffering, established a powerful empire and an administrative system which for about two centuries was efficient. But its policy of enforcing the faith of Mohammed upon the people, the ruthless cruelties of the earlier stages of acquisition and the chaos of the later stages of decline, dealt the hardest of blows at Hinduism. Not only did the Mohammedan impact check irrevocably the natural evolution of the Hindu cosmos and crystallise the flaws in its structure, but it saddled the country with a violence of sectarian schism which time shows no prospect of allaying.

Finally, when political geography was revolutionised by the new factor of sea power, the British invaded India, but in a sense and with a purpose as different as were the highways of its entrance from those of its forerunners. For barely one and a half centuries has India now been exposed to those influences of light and progress of which it was starved during the vastly longer epochs which preceded. To-day we are testing the results: and though the new wine of freedom has gone to certain weak heads, we need not be afraid of the verdict.

And now, in conclusion, what of the future? It is never wise to prophesy concerning the East: but of one thing geography assures us. India still looks out from its sea-girt coasts towards Africa on the one side and Australia on the other: no longer, however, across sundering oceans, but along the great waterways which link up the British Commonwealth. On those waterways her position is going to be one of high strategic importance. The balance of power in Europe is not any more the dominant factor in the world's polities: and it is essential to our existence as a world-wide Imperial power that we should have a ready military centre, effective naval bases, and above all a great and friendly country, in the Indian Ocean. In other words, it is imperative, so long as we take our present place in the world, that India should be a member of the British Commonwealth of Nations. Germany knew this, and bent all her policy in Africa and all her propaganda in Asia to prevent it. We must know it and shape our policy accordingly. A beginning has been made to secure an India, learning new duties and

rising to new responsibilities, proud of its growing partnership in our Empire. If we continue wisely on this course, and if we steadily and sympathetically remember the causes which have retarded India's progress in the past, her future should be secure and her association with us should be established on a firmer, more cordial, and more durable basis than ever before.

MINING DEVELOPMENT IN SPITSBERGEN.

By R. N. Rudmose Brown, D.Sc.

Considerable developments in Spitsbergen coal-mining have taken place during the last two years, and by this time probably all the accessible coal-seams on the west coast and around Ice Fjord have been investigated and claimed. The Spitsbergen Treaty, previously referred to in this *Magazine* (April 1920), still awaits ratification, having been delayed by long discussion over the mining regulations, which are to form an integral part of the treaty. As a result Spitsbergen is still a no-man's-land and Norwegian sovereignty is not yet operative. While subjects of all nations are, under the provisions of the treaty, to be given ample facilities to secure land for legitimate mining, the wholesale claiming of estates will be discouraged. Occupants of estates whose tenancy antedates the operation of Norwegian sovereignty are to be accorded special privileges with regard to their land. It is hoped that the treaty will be ratified this year, in which case the international Spitsbergen conference to be called at Copenhagen may be able to adjudicate on disputed claims before the opening of the summer of 1923.

The Dutch, after an absence from Spitsbergen since the whale-fishing days of the seventeenth century, have reappeared on the scene.[1] Acquiring land in 1920 at Cape Boheman in Ice Fjord by purchase from Norwegian owners, who had done little or nothing to develop the estate, the Dutch company, now enlarged as the Netherlands Spitsbergen Coal Company, expanded its interest in the following year by the acquisition from Russian owners of a mine on the east side of Green Harbour, and last year was busy exporting coal. The Cape Boheman estate is small in area, difficult of access by reason of shoal water, and contains somewhat poor Jurassic coal, but the Green Harbour mine, which has been in full working order since 1917, has none of these disadvantages. The seam is in the great Tertiary coal-field of central Spitsbergen and the coal is of the same high quality as the Longyear coal. Its westerly position gives

[1] Dutch interest in Spitsbergen is shown in the publication of a work on early cartography, *The Dutch Discovery and Mapping of Spitsbergen, 1596-1829*, F. C. Wieder, Amsterdam, 1919. This volume contains an invaluable collection of eighty-three maps, even if the author does not altogether make good his contention that the Dutch knew most of the Spitsbergen coasts before the British.

Green Harbour a long season of accessibility to shipping. This Company wintered parties of workmen at Cape Boheman in 1920-21 and at Green Harbour in 1921-22. The same coal is being mined in the vicinity of Coles Bay by the Anglo-Russian Company. This mine is in a 55-inch seam in almost horizontal strata within a stone's throw of the side of Ice Fjord at a height of 230 feet.

The most extensive mining in this Tertiary coal-field is at the Store Norske mines in Longyear Valley in Advent Bay. The steady growth of this concern since American enterprise began it in 1904 shows the possibilities of Spitsbergen coal-mining. It is now a large settlement with some 500 inhabitants during the height of the summer, and about 300 in winter. An unfortunate accident in January 1920, the first of its kind in Spitsbergen, led to some loss of life and the setting on fire of the old mine on the valley side behind the settlement. As a result efforts were concentrated on the new mine (No. 2) on the opposite side of Longyear Valley at a height of about 900 feet above sea level. This promises even better coal and certainly a larger output than No. 1 mine. In order to facilitate loading and provide better anchorage than the head of the bay affords, a wire ropeway is being run from the new mine along the side of the fjord for about two and a half miles to Advent Point. Under the lee of the point there is excellent anchorage, while a low-lying raised beach affords an ample site for wharves. Modern coal-loading machinery is to be installed. The new port is expected to be ready this year and to handle an annual export of 200,000 tons. Longyear city itself has shown a remarkable growth. This unofficial capital of Spitsbergen now contains many new houses built on improved plans. There are also a new post-office and a new wireless station in the heart of the settlement. Very few of the original small houses now remain; they have had to make way for new buildings as their sites increased in value. A tourist hotel is suggested at Advent Point, where in 1896-97 there stood the small tourist hut built by Vesteraalen Dampskibselskab.

The mine at Hjorth Haven on the opposite side of Advent Bay is now virtually abandoned. The poorness of the Cretaceous coal, which approaches a lignite in places, and the difficulty of working a mine at a height of 1600 feet, made the project unprofitable. The settlement at Hjorth Haven had some historic interest in that it contained many of the log houses originally erected in 1904 at Advent City in the ill-starred attempt to work the Jurassic coal. This type of log dwelling is now seldom seen in the mining camps of Spitsbergen.

In King's Bay there is a large and thriving Norwegian settlement which has grown since 1917. An outlier of Tertiary coal is easily worked and loaded by reason of safe and early approach by sea and good harbourage. In Bell Sound and Lowe Sound the only striking activities are those of the Svenska Spetsbergen Kolfält at the mouth of Braganza Bay. The settlement of Sveagrubbe, as it is called, has grown since its origin in 1917 to a large camp with extensive loading jetties and a railway from the mine. The population is about 200. The drawback to

this mine arises from its position. The settlement lies on a rough wind-swept plain, partly raised beach but mainly glacial moraine, and approach up Lowe Sound is liable to be blocked by ice until late in the season, the outcome both of the southerly position of Bell Sound and the obstacle afforded by Axel Island to the clearance of the ice of Lowe Sound itself. The same company's trial adit in the disturbed strata of Mount Pyramid on the west of Klaas Billen Bay seems to have been abandoned. There is no other Swedish activity in Spitsbergen. The Norwegian mine on Bear Island continues to export in spite of loading difficulties. The coal is Carboniferous.

Several other mining companies have been actively prospecting their estates and proving their coal-seams, with the result that the accessible coal content of Spitsbergen has been materially increased, chiefly by the addition of large areas of high-grade Carboniferous coal. A revised estimate, on the conservative side, of the accessible coal content of Spitsbergen is 10,000,000,000 tons. As geographical circumstances decide that the coal must go in the main to Norway, Sweden, Finland (by its new Arctic seaboard), and Arctic Russia, it is of interest to note that the normal total coal imports of the first three of these countries are: Norway, 2,500,000 tons; Sweden, 4,700,000 tons; Finland, 600,000 tons. Spitsbergen has therefore abundant coal to supply these countries for many centuries. The following figures give, as near as can be ascertained, the coal output of Spitsbergen, including Bear Island, since the War: 1919, 90,000 tons; 1920, 130,000 tons; 1921, 210,000 tons. The last year's total would have been larger if the Longyear mine had been in full working order.[1] The number of miners wintering in Spitsbergen in 1920-21 rose to over 1000, while the summer population last year must have been well over 1500. All the large mining settlements are now in wireless communication with the long-range station at Green Harbour.

Along with these economic developments exploration has made some progress, the important work being again done by Norwegian survey parties under Mr. A. Hoel. The last two summers they have been working between Van Mijen's Bay, Horn Sound, and South Cape, a region previously little known except in so far as the Russian Arc of Meridian expedition some twenty years ago had fixed some salient points and made some soundings in adjacent waters. The excellence of this Russian work has been too often overlooked, largely because it was published only in outline. The completed charts are believed to have been prepared but lost before publication in the Russian upheaval of 1917. Some of Mr. J. Mathieson's surveys and soundings have been incorporated in the newest edition of the Admiralty Charts.

[1] For earlier figures see "Recent Developments in Spitsbergen," R. N. Rudmose Brown, *Scottish Geographical Magazine*, April 1920. For information about the economic development of Spitsbergen reference may be made to the following, among other recent works: *Spitsbergen-Norge*, G. Isachsen, Kristiania, 1921; "Coal-Mining in Spitsbergen," H. M. Cadell, *Trans. Inst. Mining Eng.*, lx. 2, pp. 119-142 (1920), and *En Ferd til Spitsbergen*, F. Nansen, Kristiania, 1920. Major Isachsen's pamphlet contains the text of the Spitsbergen Treaty in Norwegian.

OBITUARY.

Sir Ernest Shackleton, C.V.O.

The startlingly sudden death of Sir Ernest Shackleton on board his expedition ship the *Quest* on 5th January, the day after his arrival in South Georgia outward bound, has made a profound sensation and called forth a world-wide expression of sorrow and sympathy. The body was brought to Monte Video pending the decision of Lady Shackleton as to where the burial should take place, and she, with unerring instinct, decided that no place could be more appropriate than the sub-Antarctic island where he died and where in 1916 he had landed after his memorable boat voyage from Elephant Island. It was on the forty-eighth birthday of the late explorer that the Government of Uruguay accorded a State funeral as the body was placed on board the whaler *Wandrille*, and on 1st March the interment took place at the little English church beside the Norwegian whaling station at Grytviken in South Georgia. The many memorial services in this country culminated in a magnificent ceremony in St. Paul's Cathedral on 2nd March when the Royal Geographical Society marshalled a distinguished company, including the representatives of the King, Queen Alexandra, the Prince of Wales, the Duke of Connaught, and many of the Government Departments, with travellers, geographers, and a great congregation of the general public. Why such almost unprecedented honour was done to the memory of a former Secretary of the Royal Scottish Geographical Society, whose career was no primrose path of universal popularity, it is the purpose of this brief notice to set forth.

We believe the main cause was his vivid and dominating personality, endowed with an uncommon combination of qualities which inspired him to bring the latest developments of science and publicity into subservience to a spirit of romantic adventure akin rather to the surging impulses of the sixteenth century than to the more placid mental outlook of recent years.

Born in Ireland of English ancestry, Ernest Henry Shackleton came to London as a boy and was educated at Dulwich College. Preferring a sea-faring life to the medical profession, for which he had been destined, he found himself a junior officer on the Union Castle Line at the time of the South African War, and there he made his first literary efforts in the editing of a ship's magazine and the authorship of a little book on life on board a transport. By dint of much asking and a steady determination not to take 'No' for an answer he secured the post of third lieutenant on the *Discovery*, and sailed in 1901 on the National Antarctic expedition, promoted by a joint Committee of the Royal Society and the Royal Geographical Society, under the command of Captain Robert Scott. Scott selected him as one of the small party who made the main southern journey on the Barrier Ice to the farthest south that had then been attained, 82° 17′ S.; and on the return march in extremely trying

circumstances he all but succumbed to scurvy. To his intense disappointment he was invalided home in 1903 and formed the determination to show the world that he was not unfit for polar service. During four restless years he tried several "shore jobs," not all of them very congenial, though broken by a spirited candidature for Parliament when he stood for Dundee in the General Election of 1906. The chief value to him of those years was the experience he obtained of business methods, the facility he acquired as a public speaker, the friendships he formed, more especially while Secretary of this Society, and perhaps we should add the opposition his strong character excited, for his determination always rose highest when most opposed.

In 1907 he astonished his friends and the public alike by announcing that he had organised an expedition to the Antarctic regions in the little whaler *Nimrod*. His experiences on the *Discovery* expedition and his trained imagination enabled him to foresee all contingencies, and his organising power provided for them. He had his ship towed from New Zealand to the Antarctic circle to save his coal, and he had a new plan to land at King Edward Land and push south along the middle of the Great Barrier Ice. Failing to reach solid land his caution recoiled at the risk, afterwards taken by Amundsen, of wintering on the floating ice, and he changed his plans to suit the only alternative landing in Macmurdo Sound. Realising clearly that transport was the key to polar success, he had introduced a motor-car and Manchurian ponies into his equipment, and ascending to the great plateau he reached 88° 23′ S., 97 geographical miles from the Pole, and but for the loss of the last pony, on which he had relied for food, he would almost certainly have reached the Pole itself.

The able scientific staff of his expedition accomplished the two splendid feats of climbing Mount Erebus and reaching the South Magnetic Pole, while thanks to the kinematograph, which he was the first to introduce on a polar expedition, he was able on his return in 1909 to give the public a realisation of south polar life and travelling such as had never been possible before.

The originality and daring of this great achievement, the breaking with the old polar traditions which had hampered previous expeditions, and the substantial gains to knowledge garnered by the scientific staff brought to the leader the highest geographical awards of all countries and the honour of knighthood from his own.

Shackleton was not satisfied and longed eagerly to crown his polar career by reaching the South Pole. But for several years he had to struggle with the financial responsibilities of his expedition, and before he was ready to try again the Pole had been twice reached during the same Antarctic "day," once by the route he had planned from King Edward Land, and once by the route he had pioneered up the Beardmore Glacier.

Experience has shown that a second polar expedition by the same explorer is seldom so fortunate as the first. In 1913 Shackleton

decided to attempt the crossing of the Antarctic Continent from the Weddell Sea, a plan originally contemplated by Dr. Bruce and tried in vain by Lieut. Filchner in the *Deutschland* in 1912. He sailed just as the War broke out in 1914, the Government having refused his offer of ship, stores, and men for national service. Escaping the hostile fleet under Von Spee, which might easily have sunk the *Endurance*, he met more serious opposition from the unprecedented severity of the season, but forced his way through the ice-floes of the Weddell Sea and along the coast of Coats Land. Before a suitable position at which to attempt a landing was reached the ice closed round the *Endurance* and drifted her northwards to destruction. From this complete failure of his plans Shackleton emerged triumphant with the most hazardous and successful of polar retreats to his credit. He kept his men together on the ridging and splitting floes until the last cake of ice melted beneath them in the Southern Ocean. Then in three small boats the whole party reached the inhospitable Elephant Island, and in the 800-mile boat voyage with five companions to South Georgia, the nightmare crossing of the snow-clad mountain backbone of the island, and the four successive attempts in the most inadequate small craft to rescue his comrades, Shackleton crowded into a few months an epic of devotion, courage, and persistence that will always hold its place beside the most moving records of romantic adventure since the world began. Every one who sailed on the *Endurance* returned alive.

After going to New Zealand and sailing in the *Aurora* to bring back the survivors of his Ross Sea party, Shackleton, like all his men, joined in the last stages of the Great War. He served in the Murman Expedition, where his polar experiences proved of the utmost value in directing the equipment and transport on that Arctic coast. His friends had hoped that after twenty years of adventure and struggle he would settle down to an easy life at home; but he had no sooner cleared his financial responsibilities by strenuous lecturing than his ever-restless mind turned to one more polar campaign. He thought of trying the North, but finally settled the plans of the Shackleton-Rowett expedition to include visits to many little-known and the search for several doubtful oceanic islands, and in particular to explore the Enderby Quadrant of the Antarctic. The arrangements were made with great rapidity, and the little *Quest* sailed in September 1921. From the outset misfortune beset the expedition. The weather was bad, the vessel which should prove handy enough among the ice-floes was too small to meet contrary winds and high seas in the open ocean without causing the greatest discomfort. In the end his health gave way, and he acknowledged in his diary that never before in all his life of protracted voyages had he so earnestly longed to reach port. He reached it only to die.

Shackleton had the gift of inspiring the confidence and affection of his companions, and, as he expected, many of those who were with him in the *Endurance* and survived the War came to him from all parts of the world to join the *Quest*. That little vessel pursued her voyage from

South Georgia on 16th January 1922 with the expedition under the command of Commander Frank Wild, R.N., and with Captain Worsley as master of the ship, to carry out the programme arranged by the late leader.

Shackleton had a fine literary style, and his two books *The Heart of the Antarctic* and *South* show how his mind was saturated with poetry. He was no vulgar notoriety hunter but a great soul deeply moved by the glory of great deeds grandly done, and his memory will survive as an inspiration to explorers. HUGH ROBERT MILL.

GEOGRAPHICAL NOTES.

EUROPE.

Scottish Mountains and Mountaineering.—In the issue of this *Magazine* for October 1920 we noted the publication of a Section of a *Guide*, in process of preparation by the Scottish Mountaineering Club. We have recently received the first part of this *Guide* (Section A), forming the general introduction to the whole. It includes articles on geology, meteorology, botany, and bird life, in addition to a number of more or less technical papers dealing with climbing conditions in Scotland in summer and winter, rock and snow craft, and so forth. There is also an interesting revision of Sir Hugh Munro's Classified Tables of the Scottish Mountains attaining 3000 feet. Like the Section on Ben Nevis previously noticed here, the present part is illustrated by some remarkably fine photographs, of which the most beautiful is perhaps that of Binnein Mor, in the Mamore Forest Group, taken at Easter, and showing superb stretches of snow. Less beautiful, but perhaps even more instructive, is a plate showing Ben More and Stobinian as seen on a March day with drifting snow. The curiously Arctic effect in this picture is much enhanced by the figures in the foreground, furnished with what Sir Leslie Stephen used to call the "dreadful implements" of their craft.

The scientific articles are contributed by well-known authorities on the subjects dealt with, and contain many details of much value. We may note, for example, that Professor Bower, in his article on "Scottish Mountain Botany," makes the suggestion that the appearance of shore plants, such as thrift, scurvy-grass, and so forth, on the higher levels of the Scottish hills, may be due not only to survival, the suggestion most commonly made, but also to direct transference of the seeds by sea-birds. As he points out, in Scotland the shores upon which such species grow are never very far away from the mountains, and it is quite common to find sea-birds on the higher levels of the hills. The whole article, with its careful account of the characteristics of the Scottish Alpine flora, and its discussions of the distribution of the more interesting species, is worthy of careful study.

Among other articles special mention should be made of that by Mr. Harold Raeburn on "Snow Conditions in Scotland." The author's wide experience of snow, both at home and abroad, enables him to bring together a number of interesting facts, and his account of Scottish conditions is not only exceedingly precise and detailed, but is enforced by contrasts with conditions in the Alps and Caucasus.

The general point which we wish to bring out, however, is that the pamphlet as a whole makes it abundantly clear that we have, in the Scottish Highlands, an almost unequalled field for geographical study, in the wide sense; for there is there a vast extent of land which, though so near to great centres of population, retains to a large extent its "natural" features, almost unaffected by human influences, at least in the higher regions.

Asia.

The Retreat of Russia in the Far East.—A note in the *Revue Générale des Sciences* for January 30 last, summarised from an article by M. S. Reizler in *L'Asie française*, discusses the recent steady retreat of Russia from Eastern Asia, especially since the Revolution, before the triple pressure exerted by China, Japan, and the United States. Since June 1915 the sovereignty of China over Mongolia has been re-established, and Russia has equally lost ground in Manchuria. In both cases, however, it is not only a question of frontiers; the Russian policy of economic advance has been reversed in favour of China. Similarly Japan, in pursuit of her policy of blocking the Bolshevist advance to the shores of the Pacific, has occupied the Maritime Province and taken over the Russian section of the island of Sakhalin. Between the Soviet Government, which holds a part of Siberia, and the Japanese, who hold the coast, there exists a Buffer State in the form of the Autonomous Republic of the Far East, whose destiny appears precarious. Finally, America, from Alaska as a base, is beginning to advance in Eastern Asia. Kamchatka is more easily reached by sea from the American side than it is by land, and the natural resources, notably the fisheries, forests, fur-bearing animals, and minerals, are sufficiently great to attract American capital. Following its new policy of concessions the Soviet Government of Russia is proposing to hand over a vast tract of territory in north-east Siberia to an American syndicate. Whether this arrangement is completed or not, it is clear that Russia's Far Eastern policy has meantime undergone complete reversal.

Africa.

The Egyptian Wilderness. Under this title Dr. W. F. Hume, Director of the Geological Survey of Egypt, gives, in the *Geographical Journal* for October last, an interesting account, illustrated by maps and photographs, of parts of the deserts which bound the fertile valley of the Nile. A considerable amount of space is devoted to the distribution

of sand dunes in the various areas, and to a discussion of the cause of their formation, and the origin of their constituents. The author also deals with the much debated questions connected with the origin of the Red Sea and of the Gulfs of Suez and Akaba. Dr. Hume is disposed to question Suess's view that the Red Sea is a rift valley or tension crack, and considers it possible that it may have originated from the direct erosion of an arched portion of the earth's crust. On the other hand, the Gulf of Suez, with the hills and plains which bound it, forms a region where folding and faulting are intense, and here, he believes, the topography is of a fault-controlled type.

The last part of the paper discusses briefly the industrial development of the desert areas, both at present and in earlier historic times. It is pointed out that the early Egyptian monarchs engaged in wide explorations, especially south of lat. 26° N. Notably in the region bounding the Qena-Qosseir road and that east of Edfu they found and worked gold deposits. In the first area quarries of green slate and of breccia verde antico were also exploited, while emeralds were obtained at Sikait, south-east of Edfu. Roman exploration was conducted on an even more extensive scale, ornamental stone being especially looked for. After Roman times there was a long period of apathy, and it was not till after the British occupation that new surveys were made. These have been rewarded by several discoveries of economic importance. Thus phosphates are now worked extensively at Safaga, near Qosseir, and also near the Nile, at Sibala, north of Mahamid. The manganese ores of Western Sinai are also being exploited by a company with its headquarters at the port of Abu Zenima, about midway up the eastern side of the Gulf of Suez. The discovery of rich gold ore near the Wady Alagi, in the desert south-east of Aswan, is leading to the opening up of some of the mines worked by the ancient Egyptians. Finally, the discovery of oil on the coast of the Gulf of Suez in 1908, at Jemsa, is leading to considerable developments, the petroleum found being rich in benzene.

Economic Geography.

Flax Cultivation and the Linen Industry in France.—M. Zimmermann contributes to the *Annales de Géographie* for September last a short article on this subject, noteworthy not only for the facts which it contains, but on account of the general questions which it raises.

As is well known, before the War the linen industry was one of the most flourishing of those of the textile district of the Nord department. The main centre was in the vicinity of the river Lys, where from Aire in France to Courtrai in Belgium there exists a stretch of country traditionally famous for flax cultivation and the preparation of the fibre. Thus in Lille, Armentières, and the adjacent towns, weaving and spinning were alike carried on extensively. Less important centres for both

processes were the Lower Somme valley and the region between Cambrai and Valenciennes, the latter being especially noted for the persistence of a home industry.

In connection with the source of the raw material used in this industry there are some interesting facts. It is true generally of the industry of France that, in the pre war period, home-produced material was of more account, and in consequence imported of less, than in other manufacturing countries, notably Britain. It is nevertheless also true that in the linen industry, as also in the silk and woollen ones, a progressive decrease in home produced supplies had taken place. Thus, before 1870, flax was grown in France over an area exceeding 250,000 acres, which produced 100,000-110,000 tons of raw fibre per annum. In 1913 the area, by progressive stages, had fallen to rather over 76,000 acres, and the amount to 22,000 tons. The cause was the same as that which led to the disappearance of flax as a cultivated crop in Scotland—the high costs of home production, and the competition of the cheaper Russian flax. Before the War, indeed, Russia was furnishing 80 per cent. of the world's production of flax fibre, and sent 80,000-100,000 tons yearly to France. In France it was a noteworthy feature that the centres of flax production tended to be widely removed from the areas where the linen industry was carried on, and that the slow and costly processes of preparing the lint were, to an increasing extent, carried on outside the country. The main areas of production in 1913 were the bay of Mont St. Michel in Normandy, Brittany, the Centre, and the West.

The War had, of course, a catastrophic effect on the linen industry. In France, as in Belgium, the areas where spinning and weaving were carried on were occupied by the enemy; in Belgium the same fate overtook the retting areas along the Lys. The Germans deliberately destroyed the installations concerned with all branches of the industry, and dismantled the factories, carrying off much of the machinery. In consequence, the production of flax in France fell at once. In 1915 it was only 5000 tons, and remained in the neighbourhood of this figure till 1918. This helped to increase the world shortage; but the main factor was of course first the cutting off of the Russian supplies and later, owing to the events of 1917, the practical cessation of the export of flax from that country. The result has been a great rise in price, rendering extended flax cultivation in France possible. But the linen industry has to be reconstructed from its foundation, and meantime France is threatened by a new economic rival in the markets of the world. For Germany, under the double stimulus of the disappearance of Russian flax and the eclipse of the French linen industry, is both growing flax on a considerable scale and establishing factories furnished with thoroughly modern machinery, partly home-produced and partly imported from the United States. To meet this competition the French are endeavouring to reorganise the whole industry in an entirely new fashion, taking as a model the co-operation between producers, manufacturers, and commercial men which has been

already achieved in the district in connection with the beet-sugar and dairying industries. The necessary combination between the different groups interested will, it is hoped, be facilitated by the recent discovery of new processes which will render it possible to carry out the preparation of the fibre within factories, instead of by the old slow methods. This will make it unnecessary to export the raw fibre to Belgium and re-import it ready for spinning. An endeavour is to be made to establish such retting factories in connection with producing areas, much as is done in the case of sugar-beet. In this connection it is interesting to recall the fact that the development of the beet-sugar industry on the continent of Europe was a direct consequence of the Napoleonic wars, when West Indian sugar was cut off, and that, owing to the systematic organisation of the new industry, the cane-sugar industry in the Islands suffered a partial eclipse. The facts summarised above suggest the possibility, at least, that the recent War may have a comparable effect upon flax production.

General.

Meeting of British Association.—The date of the Hull meeting has now been fixed for September 6 to 13. Appointments to the presidentships of the various Sections have been made, and Dr. Marion Newbigin is to be President of Section E (Geography).

Royal Geographical Society's Awards.—The medals and other awards of the Royal Geographical Society of London for the current session have been assigned as follows :—

The Founder's Medal to Lieut.-Colonel C. K. Howard-Bury, D.S.O., for his distinguished services in command of the Mount Everest Expedition of 1921 ; the Patron's Medal to Mr. Ernest de K. Leffingwell for his surveys and investigations on the coast of Northern Alaska ; the Victoria Medal to Mr. J. F. Baddeley for his great work on the Historical Geography of Central Asia ; the Murchison Grant to Mr. Charles Camsell for his explorations and surveys in Northern Canada ; the Back Grant to Khan Bahadur Sher Jang for his surveys on the Indian frontier and in adjacent countries ; the Cuthbert Peek Grant to Mr. F. H. Melland for his explorations in Northern Rhodesia ; and the Gill Memorial to Mr. A. A. R. Boyce for his triangulations in the Sudan.

NEW BOOKS.

EUROPE.

Things seen in Florence. By E. Grierson. London : Seeley, Service and Co., Ltd., 1922. *Price* 3*s.* 6*d. net.*

This beautifully illustrated little book will commend itself to both those who have visited and those who intend to visit the far-famed "City of Flowers." The author sketches first the history of Florence from the days of the Etruscans

and Romans to those of Christianity and the Church. With regard to the appearance of Florence, he considers that its "colouring" is one of its greatest charms. "To begin with, the river Arno varies in colour as no other river seems to vary. A thread of gold under the midsummer sun, the chilly tramontana of winter, sweeping down from the Apennines, turns it to a dirty grey or the colour of steel. Again, after a spate, it flows in a tawny brown torrent flecked with yellow foam, showing by its colour the amount of earth and sand which it carries along with it. Then, when the flood has subsided and the sand fallen to the bottom, although the current still flows strong, it has changed its hue to a green that is as clear as jade, and which will change again to a rosy red in the rays of the setting sun, deepening into purple where the shadows fall." Only an artist could have written this.

Essays on the Latin Orient. By William Miller, M.A. Cambridge: At the University Press, 1921. *Price* 40*s. net.*

Mr. Miller has travelled extensively in the Near East, but his book is based primarily upon literary research rather than upon field work. It consists of a series of articles, which appeared in a number of journals and reviews between the year 1897 and that of publication, but have all been revised and brought up to date. By far the greater part of the volume consists of essays on the history of Greece in the period between the Roman conquest in 146 B.C. and the early part of the eighteenth century. So far as their contents are concerned these articles may be regarded as forming a historical monograph on a subject rarely treated of in any detail. But their original publication as separate essays leads to a certain amount of repetition, a blemish which might have been removed in the revision. Apart from the Greek section, the book contains some miscellaneous articles, including an interesting study of Valona, and short summaries of the main historical facts connected with the Mediæval Serbian Empire and with Bosnia before the Turkish Conquest.

But if the main interest of the book is historical, the geographer will find incidentally much of value to him. We may note especially the too brief account of the establishment and development of silk manufacture in Europe. That the eggs of silkworms were introduced from China through the agency of the Emperor Justinian in the middle of the sixth century is generally known. It is, however, probably less frequently known that for six centuries the manufacture of silk was a monopoly of Greece, and was carried on especially at Thebes. The dye chiefly used was the famous "Tyrian Purple," obtained, by a privileged band of fishers, off the island of Gyaros, one of the Cyclades. In the twelfth century, when King Roger of Sicily invaded Greece, his admiral carried off the most skilful weavers and dyers from Thebes to Palermo, in order to establish the silk industry there. It would appear, however, that the silk industry of Thebes—which is now but a memory—did not immediately succumb to this blow, for it was still in existence at the end of the century, some fifty years after the sack of Thebes by the Normans.

The Blue Guides: Muirhead's Paris and its Environs. Edited by Findlay Muirhead and Marcel Monmarche. London: Macmillan and Co., Ltd., 1921. *Price* 12*s. net.*

This new series of *Guides* naturally challenges comparison, alike in the colour of the cover and in the contents, with the familiar Baedeker. A comparison between the two shows much general resemblance. *Baedeker's Paris* was before the War cheaper than the *Blue Guide*, and with all that can be said as to post

war conditions, 12s. seems a somewhat large sum for a guide to a single town. Baedeker's book appears also to be somewhat fuller, and the maps are more pleasing to the eye. In the *Blue Guide* maps interesting buildings are picked out in vivid red; the effect is ugly and we rather doubt the value of the colouration. Among the advantages of the new *Guide*, on the other hand, are the notes as to post-war conditions, among which the information as regards the air service to Paris is the most interesting point. Broadly speaking, however, there does not seem a great deal to differentiate the *Blue Guide* from the older red one.

A Text-Book of European Archaeology. By R. A. S. Macalister, Litt.D., F.S.A. Professor of Celtic Archaeology, University College, Dublin. Volume I. The Palaeolithic Period. Cambridge University Press, 1921. *Price 50s. net.*

Pre-history: A Study of Early Cultures in Europe and the Mediterranean Basin. By M. C. Burkitt, M.A., F.G.S. With a short Preface by L'Abbé H. Breuil. Cambridge University Press, 1921. *Price 35s. net.*

Since the War the Cambridge University Press has been particularly active in publishing scientific works, and it is to be hoped that the public will adequately recognise the enterprise of the Syndics. Certainly in the two examples before us we consider that enterprise to be amply justified by the quality as well as the quantity of the contents. The paper, print, and illustrations are also such as to recall to our minds pre-war standards, if not quite yet pre-war prices.

Professor Macalister's work is a treatise which brings up to date and sets down clearly and convincingly all that is known of the condition of Europe and its inhabitants during the Palaeolithic Period, and it is, in all respects save one, a model of what such a text-book should be. It is in his treatment of the Eolithic controversy that the author, in our opinion, falls short of the dignity demanded in a serious work. He himself deprecates heat as among the disputants, and mentions, almost with horror, certain recriminations and accusations which have disgraced some of the controversialists, but his own attitude is one of airy superiority, supported by would-be humorous persiflage which is not calculated to conciliate those who differ from him. All this we say without reference to the merits of the case, which we are inclined to dismiss for the present with the verdict "Not Proven," leaving it open to try it again should fresh material be discovered.

Mr. Burkitt, on the other hand, has been convinced that some eoliths, notably those discovered in East Anglia by Mr. Reid Moir, are genuine artifacts. He is very cautious in his statements, but it is clear that he is now inclined to admit the existence in Pliocene times of a precursor of man. The term which Professor Macalister "thankfully adopts" for this being is "Homosimius," equal in plain everyday language to the popular "missing link."

Apart from this matter of Homosimius, which, though of vast interest and importance, occupies necessarily only a small space in both books, Mr. Burkitt's work consists of a general survey of European pre-history, but with the main purpose of giving a clear account of the cultures of the early peoples. While of great value to the student of archaeology, to any one who possesses already even a slight knowledge of the subject, it cannot fail to prove not only an instructive, but a most fascinating book. The style is easy and graceful, and the chapters on Art (xv. to xxii.), containing as they do much that has been very recently discovered, will be found of special interest and value. The forty-seven plates, collected at the end of the volume, make up a gallery of pictures which, so far as we are aware, is unsurpassed by any other works written in English.

La Géologie de la France. Par L. De Launay. Paris: Armand Colin, 1921. *Prix* 10 *francs.*

Professor L. De Launay, of the College of Mines and Civil Engineering in Paris, is well known as one of the ablest exponents of geology among a nation pre-eminent for clearness in scientific exposition. In the present volume he has presented a most instructive and lucid summary of the geology of France. Though there is not the same intimate overlap between the geology of France and that of Scotland as there is with that of the south of England, Scottish students will be interested in this work, not only owing to the traditional friendship of the two countries, but because the old rocks which occupy most of Scotland, after disappearing to the south beneath the newer rocks of England and the north-east of France, make their first reappearance on an extensive scale in western and central France. France and Scotland, moreover, both throw light on the problems connected with the ending of the European structures on the rim of the North Atlantic basin. Professor De Launay has especially addressed his work to those interested in broad questions of structure, and lays great stress on those sections of geology which are concerned with geography. He promises in the preface to exclude all mention of the names of fossils, and though Bilobites and *Elephas primigenius* have slipped through the censorship, he succeeds in keeping his promise on the whole. This renunciation of palaeontology has its drawbacks, for geological dates are determined by it, and the reader is sometimes left in doubt as to the precise application of a statement. For example, the limits of the Cenomanian are defined by its fossils, and in the absence of reference to them it is not clear what the author includes in that stage. In his definition of stratigraphical divisions he is driven to lithological characteristics of doubtful reliability. He speaks of the Tertiary as a period whose deposits are not yet cemented and the sands still incoherent, whereas many a Tertiary rock is stronger and more coherent than many of those in older formations. The statement that the Jurassic is the era in which limestones first became dominant, and that in the preceding divisions they occupy only a very subordinate place, might lead a dweller in the Carboniferous limestone tracts in England to regard these as of Jurassic age. The author cannot avoid technicalities, and petrographic and chemical ideas and terms are included that must be as intelligible to a general reader as a simple use of the main facts of palaeontology.

His stratigraphical classification has some features different from current British usage. He adopts three primary divisions, and as his first is the Primary or Palaeozoic, he accepts the Cambrian only as a stage of the Silurian, and makes it equivalent in rank to the Sparnacian; the Devonian is placed as equal to the whole of the lower part of the fossiliferous Palaeozoic.

After an interesting introduction on tectonic geology and the geological structure of France, he describes in fourteen chapters the main geological units in France. In most cases a short account of the relations of the geology to the geographical structure, topography, agriculture, industrial development, and general history is included. Each chapter is illustrated by a well-selected series of sections, and the book is accompanied by eight excellent coloured maps which demonstrate clearly the main features in the geology and physical geography of France.

The section of the book which British readers will probably find most useful is the account of the tectonic geology. Professor De Launay says that the structure of France has been primarily due to three great earth-movements—the Caledonian in the Silurian era, the Hercynian in the Carboniferous, and the Alpine in the

Kainozoic. The chapters on the structures of the Alps, Pyrenees, and the Jura are of especial interest, and they bring out the main points of contrast and resemblance between the Pyrenees and the Alps. The author's treatment of the genera geology of France shows the increasing importance attached to earth-movements in determining the major features of a country. To formation as *fosses d'effondrement*, or valleys due to the foundering of their floors, he attributes not only the well-established case of the Rhine to the east of the Vosges, but also the Rhone Valley east of the Central Plateau and the upper valleys of the Cher, Allier, and Loire. *Aires d'ennoyage*, or sunklands, he represents as still more numerous and extensive. Professor De Launay strengthens the links between geography and geology by attributing in this way the chief topographic features and the main events in geological history to the deformation and dislocation of the crust of the earth. J. W. G.

New Masters of the Baltic. By Arthur Ruhl. New York: E. P. Dutton and Co., 1921.

We have here an American's opinion regarding the four new Republics on the eastern Baltic—Finland, Esthonia, Latvia, and Lithuania. They are based on his visits to these Republics during the World War, to which, and to the Russian Revolution, they owe their independence, the only good thing the Russian Revolution has yet accomplished. With regard to the first of these Republics, *Finland*, the author says, "It is a hard, bare—though beautiful—land where only a thrifty hard-working people could make a living at all: and the Finns have not only made a living but built cities and a civilisation which compares favourably with those of other little nations. Their capital Helsingfors, a city of about a quarter of a million people living by the sea, is a model of good building and cleanliness." The new Republic is about two-thirds of the size of France, and more than a tenth of the total area is made up of fresh-water lakes. Sixty-one per cent. of that area is covered with forests which supply most of the fuel. Wood, paper, and pulp are Finland's main resources. Sixty-six per cent. of the population is engaged in agriculture and dairying, and before the War they used to export as much as 26,000,000 pounds of butter annually. Most of the country is too cold for wheat.

Proceeding next to *Esthonia*, the author points out that the land there formerly belonged to residential large proprietors known as "Germanic Balt Barons." After the Esthonian peasants had risen against and defeated the Russian Bolshevik forces and elected a Constitutional Assembly in 1919, the Baronial estates were distributed in the form of small holdings. The forests were taken over by the State *en bloc* and superintendents were placed in charge. Esthonia is a moderately fertile agricultural country. In normal times it used to export flax, wood-pulp, butter, potatoes, cement, paper, and a great deal of alcohol made from potatoes, distilleries for its production being common on estates. Reval, the capital, contains about 150,000 people and possesses docks, shipbuilding yards, and paper, cotton, and furniture manufactories. As a rule, Esthonian peasants can read and write.

Going on to *Latvia* in 1919, the author found its capital Riga, which had more than half a million of people before the Great War, lying "like a run-down clock," as the Letts were fighting the Russians for it. Riga was formerly one of Russia's principal seaports, and exports worth fifty millions of pounds went annually from it and Libau and Windau, Latvia's other seaports. Although Riga's population dropped in 1916 to 210,590, its position, "as one of Russia's main gateways makes its ultimate recovery inevitable." When the Republic of Latvia was formed the large estates of the Balt Barons were divided and the peasants acquired small

holdings which they could either lease or possess permanently. A Balt Baron might, however, retain the right to about 125 acres of his original estate.

In 1920 the author visited *Lithuania*, whose chief towns are Vilna, Kovno, and Memel, the seaport. The Lithuanians are not Slavs. Their language is similar to Lettish. Their Republic was founded in 1920. The Lithuanian soil is richer than most of that of Esthonia or Latvia. In 1920 about 39 per cent. of the land was cultivated, 25 per cent. was covered with forests, 22 per cent. was used for grazing, and 14 per cent. was marsh. Nearly half of the whole area was in large estates of over 500 acres, mostly heavily mortgaged. Nearly 1,600,000 acres were available for division. Before the War, about a million pounds' worth of timber was annually exported from Memel. The author concludes a very interesting and lively account of his visit to the Baltic States by remarking, "The British, particularly, have made the Lithuanians, along with the other Baltic nationalities, their little brothers. They were among the first to grant *de facto* recognition; they opened a Consulate, sent a Military Mission, and a succession of Civilian Scouts."

Twenty Years in Roumania. By MAUDE PARKINSON. London: George Allen and Unwin, Ltd. *Price* 10*s.* 6*d. net.*

This is a picture of social life and conditions which existed before the Great War in a country which is still comparatively little known. The author speaks from twenty years' experience of educational work in Roumania, where she enjoyed exceptional opportunities of coming in contact with people of all classes in their own homes. Miss Parkinson writes in a pleasant and unpretentious way and has a good deal to say on such subjects as government, religion, the land system, trade and commerce, and the position of the Jews in Roumania. Retail trade is chiefly in the hands of the latter, but before the War shops had been opened in Bucharest by some of the Roumanian princes for the sale of wine and other produce of their estates. The author remarks that it is a pity no English shops had been opened in the capital, as the Roumanians favour English goods; but it seems that British manufacturers have supplied the markets with linens, woollens, and other goods. There is the too common complaint that British firms in sending out their catalogues do not take pains to convert their measures and prices into the Roumanian equivalents. The Jews are unpopular and are accused of grinding down the peasantry; but, on the other hand, proprietors let their land to the Jews, who can afford to pay high rents and trust to recovering them from the smaller cultivators. An amusing account is given of the domestic servant problem amongst Roumanian families where the patriarchal system still holds good in certain respects.

Miss Parkinson devotes several of her chapters to good-natured gossip about the late King Carol and his Queen, "Carmen Sylva," and also to the present royal family. King Carol, who was a scion of the Roman Catholic branch of the Hohenzollerns, was invited to come to Roumania on the deposition of Prince Cuza, who was the last native ruler of Roumania. As is well known, King Carol was succeeded by his nephew Prince Ferdinand of Sigmaringen, and the latter proved a good friend to the Allies, in spite of his German origin.

Under the Versailles Treaty the boundaries of Roumania have been greatly extended, and the population is increased by the large number of Roumanians who were formerly under the Dual Monarchy and Russia. In place of the 8 millions before the War it is now 17 millions, of whom some 14 millions are pure Roumanians. Miss Parkinson concludes by saying that if the ideals of enlightened Foreign Minister, M. Take Jonescu (who has always been such

sincere friend of Britain), are realised, a most important step will have been taken in the direction of safeguarding the peace of Europe.

Greek Ideals: A Study of Social Life. By C. Delisle Burns. Second Edition. London: G. Bell and Sons, Ltd., 1919. *Price* 6*s. net.*

This is a second edition of a book first published in 1917, which has only been added to the library recently. In the strict sense it is not geographical, but it is none the less valuable to the geographer in that it presents a picture of Greek life with but little direct reference to the physical conditions under which that life was lived. For those who have grasped the essential features of the geographical standpoint will find it of great interest to read the book in the light of their specialised knowledge, and to trace the relation between the social peculiarities described and the nature of the surroundings in which Greek civilisation grew up. The effects on ideals of the progressive change from the earlier period when agriculture—or more precisely gardening—was the main occupation of the Greek to that when commerce had become important are fully discussed, and the discussion raises many points of interest to the geographer.

By Loch and Stream. Angling Sketches by R. C. Bridgett, M.A., B.Sc., with 16 Illustrations. London: Herbert Jenkins, Ltd., 1922. *Price* 10*s.* 6*d. net.*

The fine illustrations will at once attract the attention both of the angler and of the non-angler on opening this book. The latter, however, may feel puzzled by the title of one of them—"Where Thunder and Lightning got him." The text has already appeared in the columns of the *Glasgow Herald*, and it is questionable whether the articles stand the test of appearance in book form. They are full of trivial incident, and the literary critic might not be complimentary to the style of writing. Still the book is primarily one for anglers, and the fraternity will readily acknowledge the author's wide acquaintance with the peculiarities of Scottish waters and the practical turn of many of his remarks. He is a keen observer of bird-life, and is capable of giving his rod a rest in its case in order that he may watch the doings of a kingfisher.

ASIA.

The People of Palestine. By Elihu Grant, Professor of Biblical Literature in Haverford College. Philadelphia and London: Lippincott, 1921. Second Edition. *Price* 10*s.* 6*d.*

The author informs us in his preface that this volume has "not been compiled from books but drawn from life." He was particularly struck with the physiography of Palestine, and says that seldom elsewhere could one have "such a fine opportunity to see the shapes of hills and valleys," they are so bare and uncovered. Then he remarks that "the springs of Palestine are its eyes, as the Arabs put it, and, when they are sparkling with life, the whole face of the country lights up with a wholesome expression." The wet season, or winter, usually provides for the welfare of the country from 25 to 30 inches of rain in the highlands. Roughly speaking, the wet season claims the five months November to March, while the dry season controls the remaining seven months. Harvest begins in the spring, May bringing the yellow heads on the grain. "The only dreadful wind in Palestine is the east wind, because it blows from the inland desert and brings excessive heat. The Arabic word for east is *sharḳ*, and so for east wind the Arab says *sherk-iyeh*," hence our word "sirocco." The flower season really begins in mid-autumn with the little lavender-coloured crocus called by the natives the "lamp

of the ghoul." Then follow the narcissus and the cyclamen, but of all flowers the general favourite is the wild anemone. Later come the red ranunculus, poppy, and tulip.

With regard to wild beasts, the most troublesome are wolves, hyenas, jackals, and foxes, the last two plundering grapes. Beautiful little gazelles occur in herds. Frequently flocks of storks are seen. Crows with grey bodies and black wings are plentiful. Ravens, vultures, hawks, and sparrows are common. Of food trees the olive is probably the most valuable, but figs, pomegranates, lemons and oranges, apricots, peaches, plums, quinces, and almonds are plentiful, and the cherry, mulberry, and walnut thrive.

Turning now to the people of Palestine we find them in three groups—the Moslems, the Christians, and the Jews. "While the Moslem population greatly outnumbers the Christian, yet there is a very considerable Christian population." A Christian village "is known from afar by its more prosperous look." With regard to the Jews, "the Semitic peasant has always been a conservative. In many ways he is to-day much like what the Canaanite occupier of the land must have been." As the author's visit was when Palestine was still under Turkish rule, he did not see the latest or "Zionist" phase of the Palestinian Jew, the result of the British administration. "Unmarried women are very scarce among the peasantry of Palestine. Marriage usually comes at an early age for girls." A woman generally wears a dark blue crash dress while at work. Her legs and feet are bare; perhaps she carries a rough pair of shoes such as the men wear, but they are for the briars and stones outside the village. Should she put them on within the village, the other women would laugh at her and call her proud or citified." The Palestine peasant can do hard work. The country life of western Palestine is organised on the basis of farming. The fact of kinship is the first determining cause of social relations in Palestine. Visiting in each other's houses is almost unknown unless the persons be near of kin. The men see each other in the market. The women see each other at the springs and at the ovens. News goes about with extraordinary rapidity from lip to lip. The entertainment of visitors and guests is a matter of honour. Conversation is lively, and the little points of etiquette are much regarded. Professor Grant's book is carefully written and well illustrated, and furnishes an attractive and instructive picture of Britain's new dependency.

In the Land of Lalla Rookh. By A. S. Wadia. London and Toronto: J. M. Dent and Sons, Ltd. 1921.

The author of this book, who at one time was Professor of English and History in Elphinstone College, Bombay, and has travelled extensively in Europe, has always, he tells us, had a great desire to visit the Vale of Kashmir. His wish was not, however, fulfilled till 1919, when he spent some months, using Srinagar as his centre, in exploring the region. His aim was to tramp a thousand miles, and this was achieved in four excursions, which carried him north, south, east, and west of his starting-point. He is, it would appear, not a mountaineer in the ordinary sense, but has a great love of walking and of literature, especially of poetry. His book is thus less a description of what he saw and experienced than of the emotions which his journeys aroused within him. If some of the accounts of his mountain adventures may tend to bring a smile to the lips of those who have climbed in the Alps, or even in the Scottish Highlands in winter, and the sentiment appears at times overdone to Western taste, the author's candour and enthusiasm disarm criticism.

The book is nicely got up and contains a sketch-map and some good illustrations.

AFRICA.

Twenty-five Years in East Africa. By John Roscoe, M.A. Cambridge University Press, 1921. *Price 25s. net.*

As a young missionary of the Church Society, the author sailed in 1884 to Zanzibar and, engaging porters, crossed to the mainland at Sadaani and marched (through country then under Arab rule) to the Victoria Nyanza, of which he says, "The size of the lake has been well compared to that of Scotland, and this comparison gives a good idea of its area. It is certainly a large sheet of water with many interesting and picturesque islands in it. In former years these were thickly peopled, but the ravages of sleeping sickness have cleared off almost the whole population." At the same time, "the water is beautifully fresh and appears most pleasing to the eye of the traveller after long stretches of desert sand." The lake has also birds of exquisitely coloured plumage, "shoals of trout," and "in Speke Gulf there were fully twelve crocodiles floating about like logs of wood on the surface of the calm water."

The author devotes several valuable chapters to the country and people of Uganda, and remarks that "the construction of the Uganda Railway has done much to improve the conditions of the interior of Africa. This railway begins at Mombasa, the port of Kenya Colony, and runs via Nairobi to Port Florence on the Victoria Nyanza. The author says, "It is now possible to reach Uganda from London within a month, whereas it used to be thought smart work if the destination was reached within six months; the usual period was eight or nine months." "Uganda is peopled by the Baganda tribe, who are clean in their habits and most particular about their person, dress, food, and general appearance." The country is almost always green with numberless evergreen trees, there are large herds of cattle and flocks of goats and sheep, extensive tracts are under cultivation, and roads and bridges are strikingly good. Yet "the fear of magic is intense; all classes alike dread its power and never feel sure that they are free from its influence." The author declares that a dreadful social evil has been introduced into Uganda by a low class of Indian traders and shopkeepers who have lived with Baganda women. "Another evil, which appeared with the decline of the old customs, has been that of the cessation of cultivation of large areas of country."

"In Uganda there is every prospect of cotton growing becoming a remunerative occupation, while rubber, coffee, cocoa, and grain will be found to be profitable, though there may not be the same facilities for exporting these crops." "In the neighbourhood of Nairobi there is land suited for almost all kinds of farm produce that will grow in tropical and semi-tropical countries; and fruit and plants which require a temperate climate seem also to thrive. Cotton plantations are being cultivated with considerable success, and cattle farming is being given a fair trial—indeed, almost all kinds of farming are being tested." Nairobi is "the great centre of East Africa, and there are stores and shops supplying all manner of goods." "It is on the high tableland of East Africa where Europeans may live in comparatively good health, if they are careful to follow the ordinary rules of life in the tropics."

Mr. Roscoe informs us in his preface that this instructive and well-illustrated volume is only "the prelude to the fuller and more scientific work" of the utmost anthropological importance which he has been enabled to do through the generosity of Sir Peter Mackie and by the assistance of the Royal Society of London.

His previous books are *The Baganda* (Macmillan and Co., Ltd.), and *The Northern Bantu* (Cambridge University Press).

My South African Year. By CHARLES DAWBARN. London: Mills and Boon, Ltd., 1921. *Price* 10s. 6d.

This is an excellent book which we can cordially recommend to the notice of our readers. Though no very precise details are given, we gather that Mr. Dawbarn went to the country in order to study its problems, and stayed there for the period named in his title. His interests are primarily political rather than geographical in the narrower sense, and, as such chapter titles as the following suggest, he faces boldly the great controversial topics—"Boer and Briton," "Black and White," "The Indian and his Critics" (in Natal). On all these subjects he speaks with sobriety, restraint, and good sense, not evading the difficulties but carefully avoiding any partisan view.

In addition to these political chapters there is some excellent descriptive matter, the account of a short tour in South-West Africa being especially useful in that it deals with post-war conditions. For the country as a whole Mr. Dawbarn has a great admiration, and he speaks very favourably of the prospects for the farmer. Great strides are now being made in live-stock raising, partly as a result of the patient, scientific study of cattle diseases and the efforts made to eradicate these. The new territory of the South-West bids fair to become a great cattle country. As regards arable farming, where irrigation is impossible much can be done both by careful conservation of water and by suitable methods of cultivation. But the risks of dry seasons are so great that the immigrant farmer should be provided with a capital reserve. At the present time, also, it is practically impossible to acquire small holdings. It is the great merit of the book that its author's enthusiasm does not blind him to these and other difficulties which have to be solved before a large increase in the number of white settlers can be looked for.

Among the Hill Folk of Algeria. By M. W. HILTON-SIMPSON. London: T. Fisher Unwin, 1921. *Price* 21s.

Three Travellers in North Africa. By the Hon. EMILY WARD. With Photographs and a chapter on Southern Tunisia by Lord LEIGH. Preface by the Hon. AGNES LEIGH. London: John Lane, 1921. *Price* 6s.

Mr. Hilton-Simpson, accompanied by his wife, has made three journeys to the Aurès Mountains in Algeria to study the Shawia, a Berber people, and to collect specimens of their handicraft for the Pitt-Rivers Museum at Oxford. The first of the journeys was in 1912-13, and the last in 1919-20, so that both pre-war and post-war conditions were experienced, and since the author has had a long experience of travel in Algeria, and has a profound knowledge of its peoples, he knew both the points in regard to which further information was desirable and how to obtain this. His task was also facilitated by the presence of his wife, who succeeded in winning the affection and confidence of the women, so that the travellers had unusual opportunities of studying the Berbers in their home life. The result is a book of much value, more especially to those interested in the habits of primitive folk.

One subject upon which Mr. Simpson was very anxious to obtain information was the medicine and surgery known to be practised among the hill tribes. Both forms of the healing art are, however, only carried on in profound secrecy, the Berbers finding that the French authorities are apt to take an unsympathetic

view when an unsuccessful operation results in death. Eventually, by the exercise of great patience and the use of simple ruses, Mr. Simpson was able to come into close contact with the local practitioners, and even to get himself accepte in some sense as a pupil. He describes in detail the operation of trepanning as performed by Berber surgeons, and notes that it is, at least sometimes, quite successful. A collection of native instruments was made, and the conclusion arrived at is that the Shawia methods are a direct continuation of those practised by Arab doctors in the thirteenth century, the knowledge acquired by Berbers in Arab medical schools at that time having been handed on by oral tradition.

Another very interesting result of the author's work is his description of the Shawia "water-clock," an exceedingly ingenious method of measuring short intervals of time, used in connection with the irrigation system by which the gardens are watered. The principle involved is the time taken by a small copper bowl, which has a minute perforation, to sink when placed in a bucket of water, each owner being entitled to so many "sinkings." One would suppose that, in course of time, the perforation would become enlarged, and the duration of the "sinking" thus diminish; but Mr. Simpson does not raise this point. There are a number of photographs, which increase the value of the book.

Of the *Three Travellers in Africa* it is only necessary to say that it is a slight, though brightly-written, account of a journey, chiefly by motor-car, through the more frequented parts of eastern Algeria and Tunisia. The authors appeared to have been too hurried to make detailed observations on the land or people in most of the areas visited, but there is a good description of Timgad. The map, rather oddly, specifies the points at which the party partook of luncheon.

Mogreb-el-Acksa: A Journey in Morocco. By R. B. Cunningham Graham. London: Duckworth and Co., 1921. *Price* 18*s. net.*

This is a re-issue of a book first published in 1898. It is stated to have been revised, but the original preface remains, and the revision has apparently been limited to the correction of misprints or minor errors. We presume that the republication of the book has been decided on chiefly owing to the new interest taken in Morocco since the landing of the French at Casablanca in 1907, and the progressive occupation of more and more territory in the period which followed. Mr. Cunningham Graham's journey into the interior in the year 1897 started from Mogador, whence he made an unsuccessful attempt to reach the town of Tarudant, in the province of Sus, not far from the new port of Agadir, and the contrasts between the conditions which he describes and those which now prevail are certainly striking enough.

The book has no index, and not even a table of contents, but three appendices are included. One of these contains reprints of letters to the Press, which have rather lost their savour after a lapse of twenty-four years. They might well have been replaced by a short note on recent history. The book will, however, be chiefly read as an expression of its author's vigorous personality rather than as a geographical description of the country traversed.

Wild Bush Tribes of Tropical Africa. By G. Cyril Claridge. Pp. 309. Illustrations and map. Seeley, Service and Co., Ltd., 1922. *Price* £1, 1*s.*

In this book Mr. Claridge sets forth the substance of his investigations into the manners and customs of the native tribes of the south-west Congo, amongst whom he sojourned for twelve years. He is evidently a keen observer and has taken much trouble to go into detail, biological and otherwise. From an ethnological point of

view his work is valuable as it records the phases of a primitive state of existence now rapidly passing away. The geographical interest is poor, and the book would be the better if the first two chapters were eliminated and replaced by a descriptive itinerary of the ground covered. Neither these, nor Chapter III., which gives an account of what the author calls "The revolt of the Ba-Congolese," are on a parity with the rest of the book. The ethnological interest commences with Chapter IV., and thence to the end is well maintained.

The book is well illustrated, and there is a useful index. H. R. W.

AMERICA.

Annual Report of the Governor of the Panama Canal for the Fiscal Year ending June 30, 1920. Washington: Government Printing Office, 1920.

This is the first time, we believe, that a copy of this volume has been sent to us. The Governor's Report summarises the detailed reports of the heads of departments who seem to have vied with one another in producing elaborated accounts of their activities supplemented by many statistical tables, graphs, etc., which illustrate in the most thorough manner the numerous ramifications of the administrative and executive services. These reports are from the engineer of maintenance (locks, building, dredging, electricity, etc.), marine superintendent, superintendent of mechanical division, quartermaster, auditor, executive secretary, district attorney, special attorney, chief health officer, and general purchasing officer. No account is given of the nature of the merchandise transiting the canal, so that we are unable to deal with the commodities that are most largely carried by this new route. British vessels hold the highest percentage of net tonnage using the canal. It will be noted that the fiscal year ends with June, while that of the Suez Canal is from December to December. From all points of view except that mentioned above the Report is sufficiently detailed for the most exacting inquirer after knowledge.

OCEANIA.

Fiji: Its Problems and Resources. By Major W. A. Chapple, M.D., D.P.H., R.A.M.C. Auckland, N.Z.: Whitcombe and Tombs, 1921. *Price 9s. net.*

This book appears opportunely. Now that the centre of the world's interest has been transferred from the Atlantic Ocean to the Pacific, British possessions in the latter assume a new importance both in relation to the United States and to Japan. Fiji, strategically, is the key to the south Pacific as Honolulu is to the north. Lying midway between Australia and Vancouver, it controls the ocean routes between the continents, while its deep-water harbours, protected by a ring of coral reefs off-shore, furnish a ready-made base for the largest British fleet. Accordingly the author favours the idea that to Britain should be entrusted the policing of the sea south of the equator, while a similar function north of the line should be performed by the United States navy with its base at Honolulu.

Of the islands themselves the author gives a pleasing picture. The climate is ideal—the temperature never reaching 100° F.; the soil is exceedingly fertile, while its immunity from malaria, yellow fever, and other tropical diseases makes Fiji a paradise for the settler. Of the natives Major Chapple does not speak so hopefully. In many cases they have surrendered their tribal rights to Government for an annual subsidy which, coupled with the fertility of the soil, obviates the necessity for working and consequently destroys all initiative. Further, the inhabitants are very susceptible to European diseases, a recent epidemic of

measles and influenza having carried off 40,000. The native population therefore inclines to be stationary or even retrograde. In this it offers a marked contrast to the Coolie immigrants from India, who increased from 26,000 in 1905 to over 60,000 in 1917. They are a hard-working people, and are increasing in wealth and social position, and the author seems to indicate that the time may not be far distant when Fiji will be an entirely Indian colony.

As a field for commercial enterprise Fiji offers unlimited scope. Sugar, copra, rubber, cotton can all be produced at remunerative prices—the largest sugar company making in 1920 a profit of almost 50 per cent. Stock of all kinds, with the exception of sheep, do well, and once labour conditions, unsettled there as elsewhere, become normal and transport difficulties are overcome, the writer looks forward to an era of continuous prosperity. As evidence of the increasing volume of trade, it may be stated that the exports and imports, which in 1918 amounted to £2,800,000, reached in 1920 a grand total of £4,200,000, an increase of 50 per cent. The value of the volume is enhanced by a fine series of photographs and a sketch-map of the Pacific.

GENERAL.

Ancient Tales from Many Lands: A Collection of Folk Stories. By R. M. Fleming. With an Introduction by H. J. Fleure, D.Sc. London: Benn Brothers, Ltd., 1922. *Price* 10*s.* 6*d. net.*

In the issue of this *Magazine* for October last (p. 242) we published the paper on "Geographic Aspects of Tradition" read by Miss Fleming at the Edinburgh Meeting of the British Association. We have now to welcome the appearance, as her first book, of a collection of folk tales, re-told for teachers and children. The author has cast her net widely, and we have tales from China and Japan, from Egypt and Babylonia, from North America and West Africa, from the Pacific and the Malay, no less than from Wales and Ireland. All the stories are told in simple and dignified language, and though, now and again, interpretations are suggested of particular myths or particular turns of the tale, there is no moralising, no attempt to "draw lessons," nothing to break the charm or the illusion. The book is illustrated by nine very attractive plates, and is one to be cordially recommended alike to the teacher and to the general reader.

Apart from the stories the book contains, under the heading of Appendices, three short essays, intended more especially for the teacher. The first of these deals with tradition and geography, the second with tradition and history, while the last gives some useful practical hints on the selection of tales and their use in teaching. The book ends with a short bibliography, and we must express a hope that when a second edition is called for, as it should be soon, the opportunity will be taken to elaborate this to some extent. It is not always easy for the specialist, steeped, as Miss Fleming clearly is, in the literature of a subject, to realise with what blank ignorance the ordinary person approaches the same subject. There is always a tendency, therefore, to make a bibliography less detailed and precise than is necessary. We would note, for example, that in the list under discussion there is, in most cases, nothing to enable the ordinary person to distinguish between such books as Professor Myres' small *Dawn of History*, which is within the reach of the purse of the ordinary teacher, and costly monographs which have to be sought in a library, often a library of highly specialised nature. We would beg, therefore, for fuller details and short notes on the books named.

We may conclude by expressing the hope that the present book will soon be followed by another in which Miss Fleming will enlarge and develop the themes

outlined in her appendices, and show by detailed examples how such stories as she has collected can be utilised in the school teaching of geography and history.

Travel in the Two Last Centuries of Three Generations. Edited by S. R. Roget, M.A. London: T. Fisher Unwin. *Price* 16*s. net.*

Laudatores temporis acti will find a good deal of inconvenient information in these pages as to the nature of travel in the olden days. The condition of the roads, the vehicles, the inns left very much to be desired, although no doubt these conditions differed widely in 1779-83, the period of the first journey recorded, from what they were in 1872, the date of the latest. The stages of progress are illustrated by many details in the narrative.

The Roget family was of Huguenot descent. Roget's *Thesaurus* is still remembered, and Sir Samuel Romilly, the reformer, was closely allied to the family. Various members have left records of their journeys, and these have been strung together and edited by one of the present generation. They are cheerful records, and misadventures are taken in good part. There is an account of a journey from London to Edinburgh in 1793 which rather lends point to a remark of Sydney Smith that "even in the best society one-third of the gentlemen at least were always drunk." Another tour was in the United States in 1818. The other tours were all in various parts of the Continent, the most interesting narrative being one which tells of the experiences of the party in 1802 when the Napoleonic power was exercised in the arrest of all English subjects within its range.

Well-selected reproductions of old prints, illustrating types of stage-coaches, as well as sketches by the travellers, give variety to the pages, and the editor's contributions are well informed and judicious.

An Administrator in the Making. James Saumarez Mann, 1893-1920. Edited by his Father. London: Longmans, Green and Co., 1921. *Price* 15*s. net.*

This is a record of a promising and brilliant career cut short by a sniper's bullet in Mesopotamia. The first nine chapters will be mainly of interest to the many friends of Captain Mann, who served in the Great War and was badly wounded in France. He showed a remarkable aptitude for Oriental languages, and it was his high personal character and his good knowledge of Arabic that led to his appointment, at the early age of twenty-six, under the British Administration in Baghdad in 1919. For ten months he was in charge of a sub-district, until March 1920, when he perished during a Nationalist outbreak. His short but valuable experience of administrative work is related in the numerous letters out of which this biography is compiled. These interesting records show the great difficulties an administrator has to face in this blessed land of Mesopotamia, seething as it is with intrigue and fanaticism. "Any idea of an Arab State," he writes (p. 182), "is simply blood-stained fooling at present, and this country cannot be handled without some sort of an army in the background. . . . The delay of the Peace Conference, and the well-intentioned self-determinators who know no facts, no Islamic doctrine, and no ethnology, have the lives of several British officers to answer for already, and they will go on adding to the list, I'm afraid. Anyway down here all is peace and quiet, and I believe we are not entirely hated on the whole. The country people are mostly non-political, and the good harvest means more to them than any talk of Arab Government." Alas! the writer was himself three months afterwards added to the list of gallant men who perished in attempt-

ing, and with success, to give the Arab State of Iraq a fair start after centuries of Turkish misrule and tyranny. Books like this, giving an intelligent account of the everyday practical experience of men who know the facts of the case are of much value, and show the absurdity of well-meant, but ignorant, attempts to impose on such a place as Mesopotamia a kind of rule that is quite misunderstood by the wild and lawless tribes who have not even an elementary conception of the Ten Commandments.

In the Tracks of the Trades: The Account of a Fourteen-Thousand Mile Yachting Cruize to the Hawaiis, Marquesas, Societies, Samoas, and Fijis. By Lewis R. Freeman. Author of "Many Fronts," etc. With Illustrations from Photographs by the Author. London: William Heinemann, 1921. *Price* 25*s. net.*

The title of this book is sufficiently comprehensive and descriptive to render a further synopsis unnecessary. The cruise seems to have taken place in 1911, but the book does not really suffer greatly from the long delay in publishing. The descriptions are brightly and amusingly done, and although we cannot say the book contains any new or striking geographical facts or theories it provides a pleasant way of spending an idle hour. The illustrations are excellent and are well produced.

EDUCATIONAL.

A Practical Geography of Dumfriesshire. By John Murray, M.A. Dumfries: Robert Dinwiddie, 1921.

This little book is a model of what a practical Geography book should be. Many so-called Practical Geographies are in reality Text-Books of Experimental Science and have little connection with true geography except that they deal with general scientific facts which are useful for the geographer to know, just as a knowledge of Astronomy, Biology, etc., is valuable to a geographical student. Here we have the real thing, and that in relation to the geography of the pupils' own county, and it would be well if similar books were available for the pupils of the other counties of Scotland. Written expressly for use in Supplementary Classes and in Intermediate and Secondary Schools, it cannot fail to awaken the keen interest of the pupils in the geography of their native county. After an introductory geological sketch and explanation of the upbuilding of the county, the author, who is Rector of Annan Academy, and knows his county, deals with relief and climate, and then applies these factors to the economic and humanistic aspect of Dumfriesshire geography. The numerous exercises, which are all practical, and include the use of the ordnance map, the making of graphs, diagrams, generalised maps, etc., cannot fail to give the pupil an intelligent grasp of the local geography and of general principles as well. Open-air work and observation are encouraged, and an appendix gives hints for the construction of clay or cardboard models.

New Regional Geographies: Book IV. The World. By Leonard Brooks, M.A. (Cantab.), F.R.G.S. London: Published by Hodder and Stoughton, Ltd. for University of London Press, Ltd., 1921. *Price* 7*s.* 6*d.*

This is the concluding volume of the "New Regional Geographies," a series of four books which form a four years' geographical course for Secondary and High Schools. Preceding volumes have already been fully reviewed in the *Magazine* (vol. xxxiii. p. 142, vol. xxxvi. p. 72), and the present book has all the excellent features of the preceding volumes, and serves as a revisal book for Fourth Year Students who are

about to take their First Public Examination. Part I. deals with the world in its major natural regions, while the rest of the book surveys the regional geography of the continents, giving more attention to those parts which are of greatest importance to British students, *e.g.* British Isles, Europe, North America, the monsoon lands of Asia, and the principal parts of the Empire. The exercises at the ends of the sections are not the least valuable part of the book, while the maps, diagrams, and statistical tables are of outstanding value and excellence. Pupils who have worked through this series should find themselves on leaving school sufficiently equipped with that geographical knowledge which is now expected of educated people, and be prepared, if need be, to proceed to a more advanced study of the subject. Slips previously noted are still retained in this latest volume, *e.g.* on page 86, 2nd last line, Dunfermline should be Kirkcaldy; p. 87, line 4, Melrose for Montrose; p. 103, line 14, Kilkenny should be Killarney.

BOOKS RECEIVED.

In the Heart of Bantuland. By DUGALD CAMPBELL. Illustrated. 8vo. Pp. 313. London: Seeley, Service and Co., Ltd., 1922. *Price* 21*s.*

Among Primitive Peoples in Borneo. By IVOR H. N. EVANS, B.A. 8vo. Pp. 318. London: Seeley, Service and Co., Ltd., 1922. *Price* 21*s.*

Early Travels in India, 1583-1619. Edited by WILLIAM FOSTER, C.I.E. 8vo. Pp. xiv + 351. Oxford: University Press, 1921. *Price* 12*s.* 6*d.*

Shuwa Arabic Stories. With an Introduction and Vocabulary. By C. G. HOWARD. 8vo. Pp. 115. Oxford: University Press, 1921.

Ancient Tales from Many Lands: A Collection of Folk Stories. By R. M. FLEMING. With an Introduction by H. J. FLEURE, D.Sc. 8vo. Pp. 193. London: Benn Bros., Ltd., 1922. *Price* 10*s.* 6*d.*

Cambridge County Geographies: Hampshire. By TELFORD VARLEY. 8vo. Pp. xi + 212. Cambridge: University Press, 1922. *Price* 3*s.* 6*d. net.*

Northmost Australia: Three Centuries of Exploration, Discovery, and Adventure in and around the Cape York Peninsula, Queensland. Illustrated. By ROBERT LOGAN JACK, LL.D., F.R.G.S., F.G.S., M.Inst.M.M. Vol. I. 8vo. Pp. xv + 366. Vol. II. Pp. xiv + 401. London: Simpkin, Marshall, Hamilton, Kent and Co., 1922. *Price* 63*s.*

Alphabets of Foreign Languages transcribed into English according to the R.G.S. II. System. By Major-General LORD EDWARD GLEICHEN, K.C.V.O., C.B., C.M.G., D.S.O., and JOHN H. REYNOLDS, M.A. Pp. xv + 71. London: Royal Geographical Society, 1922. *Price* 7*s.* 6*d.*

An Administrator in the Making: James Saumarez Mann, 1893-1920. Edited by his Father. Illustrated. 8vo. Pp. x + 330. London: Longmans, Green and Co., 1921. *Price* 15*s. net.*

Les Noirs de L'Afrique. Par MAURICE DELAFOSSE. Avec 4 Cartes. 8vo. Pp. 160. Paris: Payot et Cie, 1922. *Prix* 4 *fr.*

Uruguayans of To-day. By WILLIAM BELMONT PARKER. 8vo. Pp. 591. London: Hispanic Society of America, 1922. *Price* 15*s. net.*

Indian Images. Part I. The Brahmanic Iconography based on Genetic, Comparative, and Synthetic Principles. By BRINDAVAN C. BHATTACHARYA, M.A., F.R.S.G.S.(Edin.). 8vo. Pp. xxxvii + 79. Calcutta: Thacker, Spink and Co., 1921. *Price* 10*s.* 6*d.*

Manuel Pratique de Météorologie. Par J. Rouch. 8vo. Pp. 144. Paris: Masson et Cie, 1919. *Prix* 6 *fr.* 50.

Mysterious Japan. By Julian Street. With Illustrations. 8vo. Pp. 349. London: W. Heinemann, 1922. *Price* 12*s.* 6*d.*

La Macédoine et les Macédoniens. Par Edmond Bouchie de Belle. 8vo. Pp. 299. Paris: Lib. Armand Colin, 1922. *Prix* 7 *fr.*

Switzerland together with Chamonix and the Italian Lakes. Handbook for Travellers by Karl Baedeker. With 80 Maps. 26th Edition. 8vo. Pp. xxxvi + 537. Leipzig: Karl Baedeker, 1922. *Price* 15*s. net.*

The Friendly Arctic: The Story of Five Years in Polar Regions. By Vilhjalmur Stefansson. Illustrated. 8vo. Pp. xiv + 784. London: Macmillan and Co., Ltd., 1921. *Price* 30*s.*

A Geography of America. By T. Alford Smith, B.A. (Lond.), F.R.G.S. 8vo. Pp. viii + 329. London: Macmillan and Co., Ltd., 1921. *Price* 4*s.* 6*d.*

Le Royaume des Serbes, Croates, et Slovènes. Par Albert Mousset. 8vo. Pp. 316. Paris: Editions Bossard, 1921. *Prix* 9 *fr.*

La Syrie. By Dr. George Samné. Avec 30 Photographes et 6 Cartes hors textes. Préface de Chekri Ganem. 8vo. Pp. xix + 733. Paris: Editions Bossard, 1921. *Prix* 48 *fr.*

Up against it in Nigeria. By Langa-Langa. 47 Illustrations and a Map. Demy 8vo. Pp. 244. London: George Allen and Unwin, Ltd., 1922. *Price* 18*s. net.*

Wild Bush Tribes of Tropical Africa: An Account of Adventures and Travel amongst Pagan People in Tropical Africa, etc. By G. Cyril Claridge. With 41 Illustrations and a Map. Demy 8vo. Pp. 314. London: Seeley, Service and Co., 1922. *Price* 21*s. net.*

The City of London. By P. H. Ditchfield, M.A., F.S.A. ("The Story of the English Towns.") Crown 8vo. Pp. vi + 126. London: S.P.C.K., 1921. *Price* 4*s. net.*

Hastings. By L. F. Salezman, M.A., F.S.A. ("The Story of the English Towns.") Crown 8vo. Pp. 126. London: S.P.C.K., 1921. *Price* 4*s. net.*

The South and East African Year-Book and Guide. With Atlas and Diagrams. Edited by A. S. Brown, F.R.M.S., and G. Gordon Brown, F.R.G.S. Crown 8vo. Pp. lii + 916. London: Sampson Low, Marston and Co., Ltd., 1922. *Price* 5*s.*

Barbary: The Romance of the Nearest East. By A. Maccallum Scott, M.P. With 16 Illustrations from Photographs. Demy 8vo. Pp. 222. London: Thornton Butterworth, Ltd., 1922. *Price* 12*s.* 6*d. net.*

The Sema Nayas. By J. H. Hutton, C.I.E., M.A. With Maps and Illustrations and a Foreword by Henry Balfour, M.A., F.S.A., F.R.G.S., F.R.A.I. Published by direction of the Assam Government. Demy 8vo. Pp. xviii + 463. London: Macmillan and Co., Ltd., 1921. *Price* 40*s. net.*

The Nations of the Modern World: An Elementary Study in Geography and History. By Sir Halford Mackinder, M.A. 5th Edition. Crown 8vo. Pp. xvi + 328. London: George Philip and Son, Ltd., 1921. *Price* 3*s.* 6*d.*

Human Geography. By J. Russell Smith, Ph.D. Book I.—Peoples and Countries. 4to. Pp. vi + 354 + 15. Philadelphia: The John C. Winston Co., 1921. *Price* $1.68.

The Canada Year-Book, 1920. Ottawa, 1921.

The Official Year-Book of New South Wales, 1920.

Official Year-Book of the Union of South Africa. No. 4, 1921. Pretoria. *Price* 5*s.*

Colonial Reports (Annual).—Nigeria (1098); New Hebrides (1099); Somali-

land (1100); Swaziland (1102); Trinidad and Tobago (1103); Turks and Caicos Islands (1104); Northern Territories of the Gold Coast (1105); Seychelles (1106); Ashanti (1107); Hongkong (1108); British Guiana (1109).

Annual Statement of the Trade of the United Kingdom with Foreign Countries and British Possessions, 1920. London, 1922.

Erlauterungen zu 938 Ausgewahlten Lichtbildern zur Landerkunde. Von G. Bader, Chr. Kettler und C. Uhlig. 8vo. Band I. *Die aussereuropaischen Lander*, pp. 139; Band II. *Europa*, pp. 82; Band III. *Deutschland und Deutsch-Oesterreich*, pp. 184. Stuttgart: Theodor Benzinger, 1921.

Arabia. By D. G. HOGARTH. 8vo. Pp. 139. Oxford: at the Clarendon Press, 1922. *Price 7s. 6d.*

Baedeker's Italy from the Alps to Naples. Pp. xxxviii + 398. 1909.

Baedeker's Northern France from Belgium and the English Channel to the Loire. Pp. xxxvi + 454. Leipzig, 1909.

Baedeker's United States, with Excursions to Mexico, Cuba, Porto Rico, and Alaska. Pp. cii + 724. Leipzig, 1909.

Baedeker's Norway, Sweden, and Denmark. Pp. lx + 478. Leipzig, 1912.

Baedeker's Paris and its Environs. With 14 Maps and 42 Plans. Pp. liv + 491. Leipzig: Karl Baedeker, 1913. *Price 8s.*

Manual of Map-Reading and Field Sketching. Issued by command of the Army Council. War Office, London, 1921. *Price 3s. net.*

Manual of the Russian Language with Vocabulary and List of Phrases. Pp. 117. Leipzig: Karl Baedeker, 1914.

The Soul of Central Africa: a General Account of The Mackie Ethnological Expedition. By the Rev. JOHN ROSCOE, Hon. M.A. (Camb.). 56 Plates. 8vo. Pp. xv + 336. London: Cassell and Co., Ltd., 1922. *Price 25s.*

Terrestrial and Celestial Globes: their History and Construction, including a Consideration of their Value as Aids in the Study of Geography and Astronomy. By EDWARD LUTHER STEVENSON, Ph.D., LL.D. 8vo. Vol. i. pp. xxvi + 218. Vol. ii. pp. xi + 290. London: Humphrey Milford, 1921.

The Sudan in Evolution: A Study of the Economic, Financial, and Administrative Conditions of the Anglo-Egyptian Sudan. By PERCY F. MARTIN, F.R.G.S. With a Foreword by General Sir F. REGINALD WINGATE, Bart., G.C.B., G.C.V.O. 8vo. Pp. xxxvi + 559. London: Constable and Co., Ltd., 1921.

Die Kartenwissenschaft: Forschungen und Grundlagen zu einer Kartographie als Wissenschaft. Von MAX ECKERT. Demy 4to. Pp. xvi + 640. I. Band. Berlin: Gruyter and Co., 1921.

The Agricultural and Forest Products of British West Africa. By GERALD C. DUDGEON, C.B.E. With a Preface by WYNDHAM R. DUNSTAN, C.M.G. Second Edition. 8vo. Pp. 176. London: John Murray, 1922. *Price 7s. 6d.*

Mexico and its Reconstruction. By CHESTER LLOYD JONES. Demy 8vo. Pp. xii + 330. *Price 18s.* London: D. Appleton and Co., 1921.

New Masters of the Baltic. By ARTHUR RUHL. Demy 8vo. Pp. xiv + 239. New York: E. P. Dutton and Co., 1922.

The Canary Islands: their History, Natural History, and Scenery. By DAVID A. BANNERMAN, M.B.E., B.A., M.B.O.A., F.R.G.S. With Illustrations and Maps. Med. 8vo. Pp. xvi + 365. London: Garrey and Jackson, 1922. *Price 30s. net.*

Journals of the Travels and Labours of Father Samuel Fritz in the River of the Amazons between 1686 and 1723. Translated from the Evora MS. and edited by the Rev. Dr. GEORGE EDMUNDSON. With 2 Maps. 8vo. Pp. 164. London: Hakluyt Society, 1922.

NEW MAPS AND ATLASES.

EUROPE.

ORDNANCE SURVEY OF SCOTLAND.—The following publications were issued from 1st October to 31st December 1921 :—

Six-inch and Larger Scale Maps. 1 : 2500 Scale Maps (revised), with houses stippled and with areas. Price 5s. each. *Argyllshire.*—Sheet 258—13.

GEOLOGICAL SURVEY OF SCOTLAND.—The following publications were issued from 1st October to 31st December 1921 :—

Six-inch Maps.—With geological lines ; uncoloured. Price 2s. 3d. each. *Dumfriesshire.*—7 NW. *Lanarkshire.*—49 NE., SE. *Linlithgowshire.*—9 SW.

BARTHOLOMEW'S POCKET ATLAS AND GUIDE TO LONDON.—New Edition. 1922. Price 2s. net. *John Bartholomew and Son, Ltd., Edinburgh.*

PHILIP'S HANDY VOLUME ATLAS OF THE COUNTY OF LONDON.—Eighth and Revised Edition. Price 7s. 6d. net.
George Philip and Son, Ltd., London.

UPPER SILESIA.—A series of maps on various scales, illustrating the Silesian question, by Dr. Wilhelm Volz and his pupils.
Geographical Institute of the University, Breslau.

ASIA.

BARTHOLOMEW'S MAP OF THE MIDDLE EAST.—1 : 4,000,000. Price, mounted on cloth, 3s. 6d. net. *John Bartholomew and Son, Ltd., Edinburgh.*

This map is admirably adapted for the study of the various problems which present themselves in the Near and Middle East. The boundaries of Irak, Syria, Kerak, and the other States are clearly defined and the map is orographically coloured.

CATALOGUE OF MAPS PUBLISHED BY THE SURVEY OF INDIA.—Corrected to Jan. 1921. Price 1 rupee.
Superintendent of Government Printing, Calcutta.

AFRICA.

BARTHOLOMEW'S PHYSICAL WALL MAP OF SOUTH AFRICA. 1 : 1,400,000. Third Edition. Orographically coloured. In two sheets. Size when joined 4 feet by 6 feet. Prices from 10s. 6d.
John Bartholomew and Son, Ltd., Edinburgh.

The colouring in this new edition has been improved by the introduction of purple for the greatest elevations.

NORTH AMERICA.

DOMINION OF CANADA.—Indicating Natural Resources, Transportation and Trade Routes. 1 : 6,336,000. Second Edition. 1921.
Department of the Interior, Canada.

CANADA STANDARD TOPOGRAPHICAL MAP.—1 : 500,000. Sheet 38 with parts of 39, 64, and 65. 1921. *Department of the Interior, Canada.*

NEW BRUNSWICK.—Indicating Natural Resources. 16 miles = 1 inch.
Department of the Interior, Canada.

MANITOBA. Showing Disposition of Lands. 1 : 792,000. Seventeenth Edition.
Department of the Interior, Canada.

UNITED STATES SURVEY. Topographic Sheets on various scales. The figures after the name of each State indicate the number of sheets received.

Scale 1 125,000.—Arizona, 1; Washington, 1; Wyoming, 1.

Scale 1 62,500.—California, 5; Illinois, 1; Kentucky, 1; Maine, 2; Michigan, 2; Missouri, 1; New York, 2; Oregon, 1; Pennsylvania, 1; South Carolina, 10; Texas, 3; Vermont, 2; Virginia, 2; Washington, 1; West Virginia, 2; Wisconsin, 1.

Scale 1 : 31,680.—California, 1; Montana, 1.

MAPA GEOLOGICO-ECONOMICO DE LA REPUBLICO ARGENTINA.
1 : 200,000. Sheet 35 (Bahia Blanca).
Ministerio de Agricultura, Argentina.

AUSTRALIA.

VICTORIA. Geological Maps. 40 chains = 1 inch.
Mirboo, County of Buln Buln.
Budgeree, County of Buln Buln.
Geological Survey of Victoria.

GENERAL MAPS AND ATLASES.

ATLAS GEOGRAPHIAE BIBLICAE. Editio Minor, by Aloisius Gramatica. 1921. Price 10 lire.
Istituto Italiano d'Arti Grafiche, Bergomi.

PHILIP'S NEW SCHOOL ATLAS OF COMPARATIVE GEOGRAPHY. New Edition, 1921. Price, in cloth covers, 3s. 6d. net.
George Philip and Son, Ltd., London.

PHILIP'S COMPARATIVE WALL ATLAS OF COMMERCIAL DEVELOPMENT. Edited by George Philip, F.R.G.S.
5. Africa. Price 3s. 6d. net.
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George Philip and Son, Ltd., London.

A new series of maps in which the distribution of population is associated with the character of the economic development of the country. Industries are indicated by symbols, and the imports and exports of the leading ports are named, and Railways, Navigable Rivers, and Steamship Routes are shown.

BARTHOLOMEW'S CHART OF THE WORLD, on Mercator's Projection. New and Revised Edition, 6 feet by 4 feet. Mounted on cloth and rollers, £2, 2s.; on cloth, with eyelets, £1, 10s.
John Bartholomew and Son, Ltd., Edinburgh.

This map, which is intended for schools, libraries, and public institutions, has been thoroughly revised. All the most recent boundary adjustments are indicated as well as Ocean Currents, Steamship Routes, and Cables.

BRITISH EMPIRE. Imperial Institute Map of the Chief Sources of Metals, with Diagrams of Production. Price 5s. 6d. net.
George Philip and Son, Ltd., London.

'TIMES' GAZETTEER OF THE WORLD. Edited by John Bartholomew, M.A., M.C., F.R.S.E., F.R.G.S. Price £1, 1s.
'Times' Office, London.

THE SCOTTISH

GEOGRAPHICAL

MAGAZINE.

THE BERBERS OF THE AURES MOUNTAINS, ALGERIA: A STUDY OF A PRIMITIVE PEOPLE.[1]

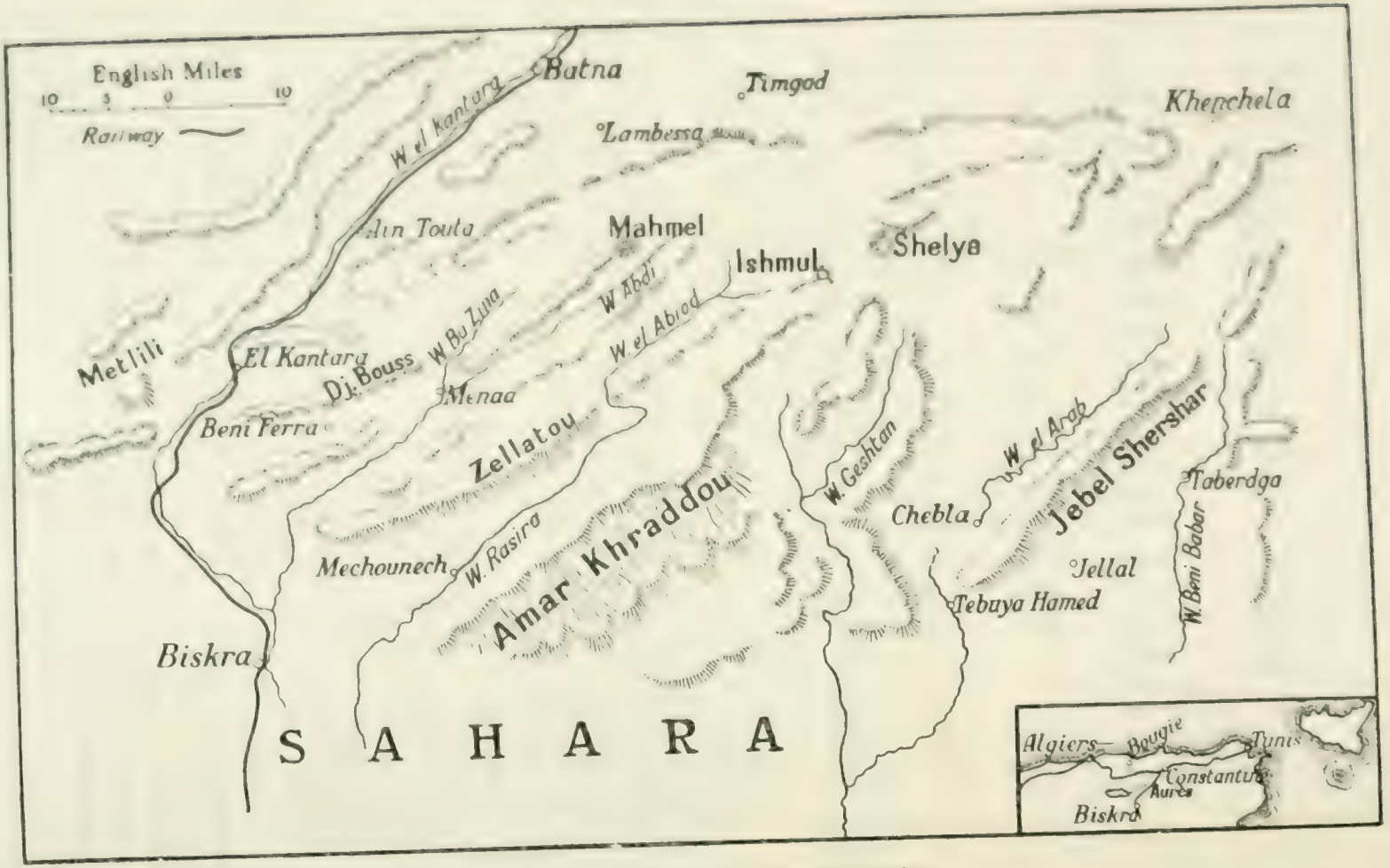
By M. W. Hilton-Simpson, B.Sc., F.R.G.S., F.R.A.I.

When in 1912 my wife and I determined to undertake ethnographical researches among a Berber people of Algeria and to collect specimens of their handiwork for the Pitt-Rivers Museum, Oxford, we were naturally guided in our choice of a locality in which to work by the physical features of the country.

We knew, of course, that the remnants of, presumably, the oldest of the peoples of the Barbary States must be sought among the mountains in which, from time to time throughout the ages, they had found refuge from successive waves of foreign invasion. It remained, therefore, for us to select a mountain country insufficiently fertile to attract the early conqueror; strong enough in its natural defences to afford a safe asylum to its Berber inhabitants during the frequent struggles which have convulsed North Africa in the past; as yet unpenetrated by highways likely to admit the increasing stream of modern tourist traffic, a power for the removal of ancient arts, crafts, and customs as great as that of any warlike invader. We experienced little difficulty in choosing such a field for our work.

Disregarding the more or less fertile mountain home of the Kabyle Berbers in the coastal ranges of Algeria, as having been more liable to foreign influence, ancient and modern, than some remoter districts, we decided upon the massif of the Aures to the north-east of Biskra, on the fringe of the great desert; a region in which the Berber race, to which

[1] A Lecture delivered to the Society in Edinburgh on March 2, 1922.



W.C.H 1922

Fig. 1.—Sketch-Map of the Aures Mountains.

its Shawiya tribes belong, might reasonably be expected to have preserved arts and crafts, manners and customs of other days, but little altered by contact with the outer world. The natural fortress of the Aures is well protected by its geographical frontiers (Fig. 1). A line of steep-wooded slopes, forming the northern boundary of the massif, frown down forbiddingly upon the central high plateau of Algeria, upon the famous Roman ruins of Timgad and those of the garrison town of Lambessa, the very size of which place of arms is sufficient evidence that Rome did not overawe the mountain tribes to such an extent as to feel secure from their attacks.

Immediately to the south of these slopes the rocky ridge of Mahmel in the west, the peaks of Ishmul in the centre, and of Shelya to the east (the latter attaining a height of 7630 feet above the sea), their rocky summits clothed with snow during the greater part of the year, form the watershed of the Aures. From it several streams flow south-westward through high-lying valleys between ridges of grey rock, passing out to perish in the Sahara through deep and narrow gorges, mere clefts in a precipitous wall of barren rocks whose brilliant coloration at sunset fills with admiration the winter visitor to distant Biskra, as he gazes upon their marvellous shades of orange and pink, softening to purple as night steals upon the wilderness and the hills. A mere glance at this southern rampart of the Aures is sufficient to show why the seventh-century Arab conqueror, Sidi Oqba ben Nafi, endeavoured to use persuasion rather than force in his efforts to impose the faith of Islam upon the Shawiya mountaineers, by whom he was eventually slain in battle at a point in the desert to the east of Biskra.

The eastern boundary of the massif is guarded by the barren ridge, some 5870 feet above sea-level, known as the Jebel Shershar, which runs north-eastward from the Sahara, some sixty miles to the east of Biskra, towards the central Algerian plateau. Upon its western frontier frowning rocky hills—beneath which now run the motor road and railway to Biskra from the north—oppose any would-be invader approaching from this side. Within these steep, forbidding frontiers a series of ridges, running for the most part from north-east to south-west from the watershed of the Aures towards the desert, divide the massif into a number of remote and hardly accessible valleys, the scenery of which is as remarkable for its sharp constrasts (cf. Figs. 2 and 3), as for a beauty scarcely to be equalled in other districts of Algeria.

Thus the pine and cedar forests of the northern slopes and the grey, rocky valleys of the central Aures, dotted with the juniper and ilex of Europe, peopled by fair-haired, light-skinned Berbers, might well form part of a continent remote from that which reveals itself to the traveller so short a distance to the south, a country of barren, rocky ranges, glowing red in the sunlight, overlooking great oases of date palms through which the streams of the Aures meander on their way to the desert, a land of tent-dwelling, nomad Arabs. Indeed, at several points in the west and centre of the massif a ride of but a dozen miles may

well seem to transport the traveller, as if by magic, from southern Europe to the fringe of the African desert.

In these secluded valleys my wife and I commenced our work among the Shawiya, spending three winters in slowly wandering from south to north up the courses of their poor streams, visiting hamlets as small and remote as we could find as well as all the larger villages of the hills.

During a fourth winter we spent most of our time at our "base," the oasis of El Kantara on the railway, thirty-five miles to the north of Biskra, comparing our notes upon the hill folk with the life of the

FIG. 2.—The valley of Bu Zina from the NE. Contrast Fig. 3, and note the South European character of the vegetation.

dwellers in the plains, while I revisited some of the Shawiya settlements of the western Aures.

In order to observe as closely as possible the daily life of the mountaineers, we lived in native houses in the villages in preference to camping outside, and we employed no servants other than a native mounted orderly kindly lent to us by the French administrative authorities. In this way, living actually with the Shawiya, we found that we could enjoy excellent facilities for observing their daily life and customs. The physical characteristics of the people and their Berber speech, which were not the objects of our purely ethnographical investigations, clearly stamp the Shawiya as human relics of a very distant past.

Many of their arts and crafts, however, have evidently crept into the hills at various later periods of North African history, and, although

not indigenous, have persisted in the original form in which they were introduced. Some of these I have already described elsewhere. For example, an olive-press exists to-day at Beni Ferra, in the south-western corner of the massif, which resembles a press of Roman times, reconstructed by Professor J. L. Myres from a ruined site in Tripoli, so closely that the same man might well have designed and erected the two (see *Man*, August 1920). Again, an account of the perforated copper bowl, possibly of Roman origin, which, sinking in water four times per hour, is used in the same place as a "water-clock" for apportioning the time of canal irrigation allowed to each landowner in a country where periods of drought are all too frequent, is given in the *Geographical*

FIG. 3.—Looking NE. towards the Abdi valley from Jemora, in the SW. corner of the Aures.

Journal for January last, as well as in my book on the *Hill Folk of Algeria* (cf. p. 44).

Without moving farther into the fastnesses of the Aures than this same village of Beni Ferra, yet another craft may be observed which appears certainly to have been introduced at the time of the Roman occupation of the surrounding country, namely, the manufacture of stones for the quern or rotary hand-mill for grinding corn.

This hand-mill, used in the Aures and by the nomad tribes of the surrounding desert, is the most primitive means of producing flour with which I have come into contact in Algeria, yet it is by no means the oldest to be found in North Africa.

James Richardson, the well-known desert traveller, who visited Ghat in Fezzan about the year 1845, there observed and illustrates in his

Lady Dorothy Mills in *The Great Desert of Sahara*, ii. 81) a hand-mill of the "saddle stone" type exactly resembling that used under the Old Empire of Ancient Egypt, described by Erman in his *Life in Ancient Egypt* (translated by Miss H. M. Tirard), in which flour was produced by rubbing the corn between the stones: "The lower larger stone was fixed and sloped towards the front, so that the prepared flour ran into a little hollow in the front of the stone."

This method of hand-milling was generally in use in Syria, Egypt,

FIG. 4.—Making a quern.

and the Aegean as well as in most parts of Central and Western Europe, and, without doubt, Algeria, before the rotary quern was invented. According to Messrs. Bennett and Elton in their *History of Corn Milling* (vol. i.), it was invented in Italy, possibly by the Volsinians, as late as about the second century B.C.

Assuming that Bennett and Elton are correct in their conclusion, drawn from a mass of evidence, that the quern originated in Italy, there seems little room for doubt that the Romans introduced it into the Aures, probably shortly after their arrival there, for I have noted in Algeria no such elaborately carved grinding surfaces as are to be seen in some, perhaps later, Roman specimens illustrated by these authors.

The stones which constitute the quern are chipped by hand in those areas of the Aures where this stone can be quarried. Thus the village of Beni Ferra enjoys quite a small export trade in querns to the western portion of the massif, from Batna to Biskra, and to the nomad camps at the foot of the hills, while the eastern portion of the Aures obtains its supply of millstones from such villages as Tebuya Hamed and Jellal, beneath the ridge of the Jebel Shershar. The quarrying operations are somewhat dangerous, for the stone is found at a considerable depth below the surface of the soil, which is liable to collapse and so entomb the native in the act of digging out his material.

A piece of stone of a size suitable for the manufacture of a pair of millstones having been extracted from the earth, it is roughly hewn into a cylindrical form and is then split into two portions, thus giving the same diameter to the upper and lower grindstones. This is carried out by means of a locally-made iron-headed tool fitted with a wooden handle, known in the Shawiya dialect as "a'afedīs" and resembling a short and heavy pick. As a rule this is the only implement required for the fashioning of grindstones, though a man may use it in four different sizes; hammers and plain steel chisels have, however, found their way into the hands of some workmen at Beni Ferra.

The quarrying of the stone and its rough fashioning, carried out before removal from the quarry, occupies from about fifteen to twenty days. A further three or four days' work is required in the maker's house. This includes trimming the quern; socketing a vertical wooden peg in the centre of the lower stone; perforating the centre of the upper one with a hole, through which this peg must pass so that the upper stone may be turned around it when grinding, and through which the grain may be poured by hand to fall between the two stones; boring a hole at one side of the upper surface of the top stone into which a short vertical wooden handle is fitted for the turning.

Such a twin-stone quern is sold for as much as twenty-five francs since the War. In the tents of the desert and in most Shawiya huts the quern is simply placed upon a mat when grinding is to take place, but in some more elaborate houses of the desert and the hills the quern is set upon a plinth of masonry or mud brick, in which a trough around the lower stone serves to catch the flour as ground. Thus the Shawiya use habitually to-day the rotary hand-mill or quern which, invented in Italy and introduced into much of the old world in the wake of the Roman conqueror, has spread to such widely separated countries as Japan, Ceylon, Scandinavia, Ireland, and Scotland, in the two latter of which it was still in use some seventy years ago (Bennett and Elton, vol. i. pp. 166 and 171).

Though the quern is still the corn-grinding apparatus of the tent-dwelling nomads of Algeria, and of all dwellers in districts not blessed with the possession of more or less perennial streams, yet in the Aures and in other mountainous regions where such streams exist, a simple type of water-mill is to be found in use by those who can afford to pay

a miller ten per cent. of their grain, or its equivalent in money, to grind for them the flour necessary for their subsistence. This primitive machine consists of two circular millstones, rather larger than those which constitute the quern, the upper one of which is caused to rotate by water-power instead of by hand. The apparatus (Fig. 5) is erected in a font of the ordinary stone Shawiya type beneath which flows a small "saqiya," or irrigation canal.

The upper circular millstone, A, rotates horizontally upon a stone

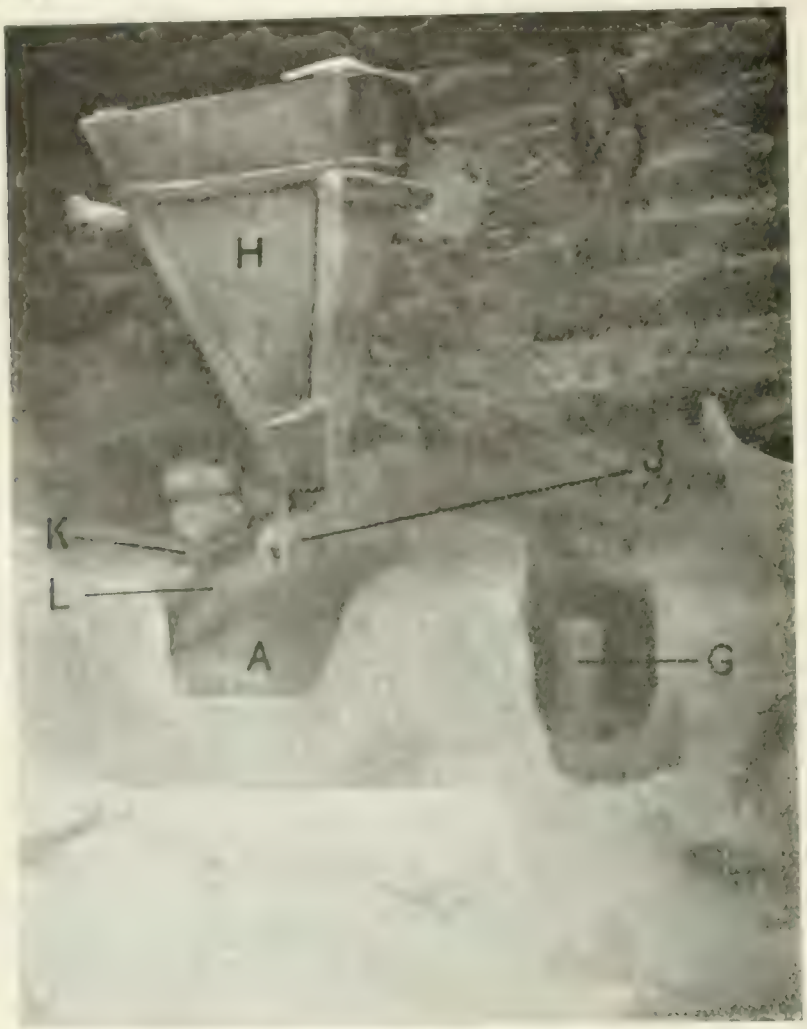


FIG. 5.—Photograph of a Shawiya water-mill.
(For explanation of letters see Fig. 6.)

of similar diameter, B, which is immovably embedded in masonry beneath it. From the axis of the upper stone, to which it is firmly attached, a wooden shaft, C, descends through the floor of the building, passing through the centre of the fixed lower stone and terminating at its lower extremity in a horizontal rimless wheel of wood, D, the spokes of which are often curved in the same plane as the wheel, and are broad and slightly hollowed on their concave side. This horizontal wheel is suspended by means of its shaft in the centre of the "saqiya," E, at a point just below a short fall in the course of its stream, so that the

water, falling from a height of a few feet, or even inches if the stream be strong, strikes against the hollowed, concave spokes of the wheel. The wheel is thus caused to rotate rapidly and so produce a rotary

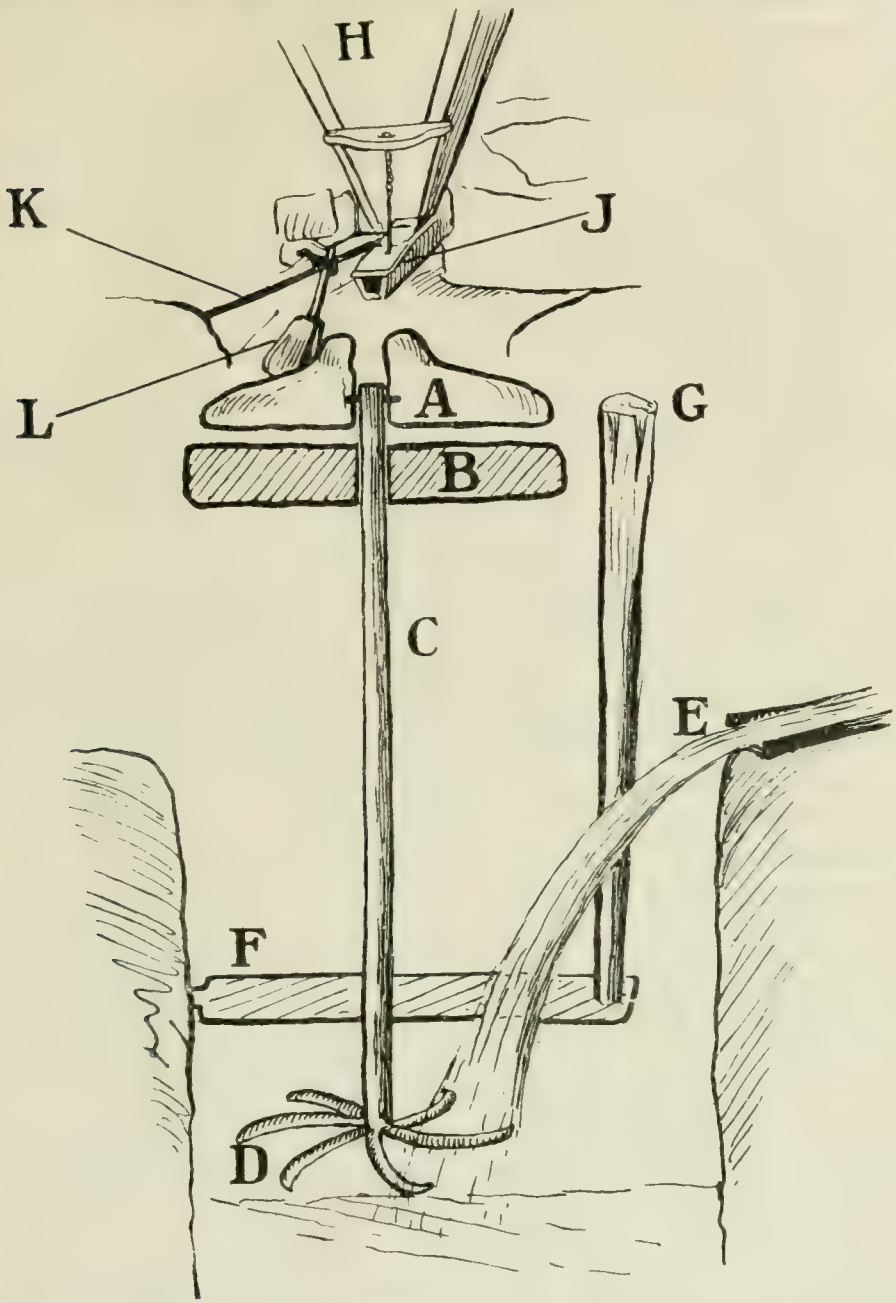


FIG. 6.—Diagram of a Shawiya water-mill.
A, upper millstone; B, lower millstone; C, shaft; D, rimless wheel; E, water channel; F, plank used to stop current; G, handle; H, hopper; J, feeder; K, horizontal rod; L, stick resting on upper millstone.

movement of the upper millstone which, as we have seen, is firmly attached to the other end of its shaft (Fig. 6).

So long as the water falls upon the horizontal wheel the mill is working. In order to stop the upper grindstone when required a plank of wood, F, is attached at one end to the side of the "saqiya" so that, by means of a handle, G, extending upwards into the mill-house, it can

be interposed between the stream and the horizontal wheel, which thereupon ceases to receive its impetus and accordingly comes to a standstill. A slightly more elaborate variation of this system of stopping and starting the mill is to be found in some cases in which the horizontal wheel is suspended in a channel beside and below the "saqiya," the stream from which is deflected to fall upon the wheel by means of a small movable conduit of wood, actuated from above by means of a handle, when it is desired to start the mill. The conduit is pushed back so that the water resumes its normal course along the "saqiya" when grinding operations are to cease.

The corn to be ground is placed in a receptacle, or "hopper," H, of wood or plaited halfa-grass in the shape of an inverted cone, which is either fixed to the wall or suspended from the roof of the mill-house so that its open apex is very nearly above a hole in the centre of the upper, or revolving, millstone. From this open apex a short wooden spout or "feeder," J, projects at right angles, so that the grain passing through it falls into the hole in the centre of the upper stone and so finds its way between the two stones by which it is ground into flour.

One end of the "feeder" is loosely attached (often by means of a piece of leather) to the apex of the corn receptacle, H, its other end being suspended over the hole in the stone by strings attached to the side of the receptacle above it. To this "feeder" is fixed one end of a small horizontal rod, K, the other end of which is loosely attached to the masonry surrounding the apparatus, while to the horizontal rod is lashed another stick, L, a knob at the opposite end of which rests upon the upper grindstone.

As the stone rotates it causes this stick to tremble, the oscillation being imparted by the horizontal rod, K, to the spout, J, the regular movement of which causes the grain to drop continuously little by little to be ground between the stones. This simple water-mill is obviously a direct descendant of the hand-quern already described, but it does not appear to have originated in the same country.

Bennett and Elton ascribe to one of the three Greek poets named Antipater the first reference in literature to a water-mill, about a century before Christ, and they point out its subsequent common use in Italy, whence, no doubt, it spread in its early days to the Roman dominions of North Africa. Its employment has extended, like that of the quern, to widely separated countries of the Old World, so that the type existing among the Shawiya is, or has until recently been, in use in Scotland, Ireland, and Scandinavia (where it is known as the Norse or Northern mill), in the Carpathians, Bosnia, Lebanon, Carmel, and in western China.

Not only is the mechanism to be found in these countries almost exactly identical with that of the Shawiya mill, but the description of a mill-house in Shetland, quoted by Bennett and Elton from Hibbert's *Shetlands* (1822)—a "low shed of unhewn stones stretching across a diminutive streamlet over which it was possible to stride"—might just

as well have been written with reference to any mill-house existing in the Aures to-day.

From the two or three examples of primitive machinery and of time measurement referred to above it will be apparent that Roman influence, having crept into the Aures more probably in the piping times of peace than in the wake of an army attempting the conquest of the massif, has left a mark upon certain aspects of Shawiya culture which in the lapse of twenty centuries has scarcely commenced to fade.

In the secluded valleys of the hills, however, arts may now be observed in practice which have persisted in this cultural island with little or no modification from times of far greater antiquity still. One of the most readily noticed of these is the manufacture of hand-made pottery.

The art of pottery-making without the aid of a wheel is carried on by the Berber women of many localities in Algeria, that produced by the Kabyle tribes of the coastal mountains to the south-west of Bougie having attracted considerable attention from archaeologists. In the *Journal* of the Anthropological Institute for 1902 Professor J. L. Myres, in a paper dealing with this Kabyle pottery, after remarking that the potter's wheel was known in Carthaginian Africa "at least as early as the seventh century B.C.," goes on to say, "The pedigree, therefore, of the Algerian hand-made fabrics may probably be traced back at least to the ninth or tenth century B.C., on the evidence of the mode of manufacture alone."

Now the Kabyle pottery is more varied in form, of superior symmetry and workmanship as well as far more elaborate in its painted decoration, than the rough ware manufactured to-day by the Shawiya women.

It seems probable, then, that a glance at the potter of the Aures, as she moulds her clay in the sunshine before the low doorway of her hut of untrimmed stone, may reveal to us a vision of the occupations of her ancestress in days before the dawn of history.

Almost all the women of the Aures are more or less skilled in pottery-making. In most places they manufacture the dishes, pots, funnels for filling goatskin bottles, bowls, etc., which they require for use in their own households; in villages near the edge of the Sahara, however, a certain amount of pottery is made for sale to the tent-dwelling nomads of the plains, who can find no suitable earth in their desert land. Before the War pots were bartered for their fill of dates, a staple food which the high valleys of the Aures cannot produce.

Upon a warm sunny morning, when the ground is dry, the Shawiya women go forth to dig the necessary clay in the neighbourhood of the village, passing it through a form of sieve before carrying it home in baskets. The clay used is of a yellow colour.

Arrived before her cottage door, each woman places before her a wooden dish turned upside down, or a flat piece of an old halfa-grass basket, and moistens her clay with water from a bowl at hand. In some

areas, such as the valley of Ba Zina in the north western corner of the Aïrrs, or the Kasra canon in the south central portion of the range, a small quantity of powdered potsherds is mixed with the earth for the making of new vessels; in other areas, for example at Beni Ferra, the clay is said to be too "good" to require this admixture (Fig. 7).

The woman then kneads her moistened clay upon the dish or basket into the circular form of, let us say, a large flat dish destined for the preparation of unleavened bread. Having kneaded out the bottom to

FIG. 7.—Pottery-making at Beni Ferra.

the thickness she requires, she digs with her thumb a shallow trench just within its circumference into which she places the strips of clay intended to form the side of the vessel. This clay she applies in three strips, measuring each, for length, by the diameter of the bottom she has prepared.

This done, she carefully smooths over by hand the inside of the dish and the outer side as far as it can be reached without raising the moist clay from its resting-place; she then places it, "base" and all, in the sun to dry. When nearly dry she polishes its surfaces with a snail's shell or a smooth round pebble.

In some areas, such as Beni Ferra, in which suitable material can be found, a layer of red or rose-coloured earth, known as "iwenken," powdered and mixed with water, is applied to the pots when dry, in order, it is said, to strengthen them ; but often, even where this earth is plentiful, panels are left uncovered by it on the pots, which panels are sometimes decorated with rough designs.

In many districts, however, earth suitable for this purpose cannot be found. It is used at Beni Ferra, and in a few other villages, as a pigment, applied by means of a doubled straw, to produce decoration in herring-bone, criss-cross, square, or cross patterns upon the panels which, as noted above, are left upon some pots for this purpose ; each pattern having its own name and, possibly, a very ancient signification, such as the sign of the early Egyptian goddess Neïth which, as I have pointed out in the *Geographical Journal* (January 1922), may perhaps be discernible in one of them. The original meaning of these primitive designs is, however, extremely difficult to ascertain, for the Shawiya, having long since embraced the faith of Islam, are of course quite ignorant on the subject.

When the necessary number of pots, bowls, and dishes have been made several women combine to bake their wares together.

Making a heap of stones, they place their sun-dried pots upon its summit and around its sides, laying the smaller vessels upon the stones and covering them with the larger dishes. They then cover the whole with brushwood, old halfa-grass sandals, the sweepings of their houses, etc., to which they set light and replenish for the space of from one and a half to two hours, at the end of which time the pots are considered to be sufficiently baked.

Beneath the slopes of the Jebel Shershar, the eastern bastion of the Aures, an artificially prepared fuel is sometimes used for pot-baking, consisting of cakes of dried dung and earth, the slow burning of which is held to be very suitable for the purpose.

When baked, the pots are removed with the aid of sticks and, while still too hot to be touched by hand, are varnished with a substance known as "luk," a raw shellac, or with the gum of *Juniperus oxycedrus*, the former imparting a deep red and the latter a yellowish-green colour to the surfaces so treated. As a rule only the interior of the vessels and the upper portions of their outside are so covered with varnish.

Though all the pottery manufactured by the Shawiya is extremely primitive in form and workmanship, that made in the vicinity of the Jebel Shershar appears to be more crudely fashioned and to exhibit less variety in design than that of the western valleys of the massif. Yet in certain villages of the Jebel Shershar we found a rudimentary attempt at applying to some vessels a white "slip," or outer covering, which may well afford us a glimpse of the earliest efforts of those Kabyle potters who, for untold centuries, have applied such a "slip" to some of their wares in a form which, though considerably more perfected than that found in the Aures, has been considered by Professor J. L. Myres

Journ. Anth. Inst., 1902) to resemble certain Neolithic pottery of Sicily.

In the Jebel Shershar the material used for this "slip" is powdered gypsum, to be found in many areas of the Aures; but it is so roughly applied that it soon wears or crumbles away from the pot. Indeed, the unsuitability of the material may perhaps, in addition to the conservative nature of the Shawiya, supply a reason why the covering of pots with a white "slip" has not advanced beyond the very rudimentary stage in which we found it beneath the slopes of the Jebel Shershar.

The foregoing notes upon the pottery made by the Shawiya women will have shown that we were able during our wanderings to observe the

FIG. 8.—The village of Maafa.

occupations of the gentler sex as well as those of the men. This was due to the presence of my wife. It is perfectly true that the Shawiya women are not concealed from view to the same extent as their Arab neighbours of the desert oases; they do not veil, and they pursue their everyday occupations in view of all beholders. Their position, in fact, is one of considerably greater freedom than that of the Arab women.

Nevertheless they are Mohammedans and, as such, the more respectable among them can scarcely be expected to converse freely with a male stranger travelling alone, though the very numerous *divorcées* and dancing girls of the Wad Abdi valley would have little compunction in so doing. The presence of my wife, however, who was the first European woman many of the female inhabitants of the remoter villages had seen, filled them with a curiosity which enabled us to become

friendly with them and to observe in detail many of their arts and crafts.

Their daily round is one of toil. Every moment which is not occupied in such duties as carrying heavy goatskins full of water from the brook to their eyrie-like villages among the crags overlooking the valley (Fig. 8), cooking, grinding corn, washing clothes, making pottery, tanning goatskins, making mats of halfa-grass, weeding their little fields, etc., is spent in the spinning of wool and weaving it into garments for the male members of the family upon a very primitive vertical hand-loom, in the use of which every woman of the Aures is well skilled. Thus it will be seen that, although the men find ample leisure for consuming immoderate quantities of coffee in the little cafés to be found in all the larger villages, the women have but little time for distractions.

Distractions, indeed, are few and far between in the hills, and consist solely in dances, usually performed by professional *danseuses*, at weddings or at the various annual feasts, of which several are observed by the Shawiya. Some of these feasts date from their adoption of the faith of Islam; the origin of others is by no means clear, but though now believed by the natives to form part of the ritual of their new creed they are evidently of much greater antiquity.

The music at these feasts is provided by hautboys and tambourines. It is, perhaps, curious that in the Aures hills the bagpipes are not to be found, save very rarely in the hands of a strolling musician from the plains; in the desert, however, the piper, hailing usually from Tripoli or Morocco, is by no means rare.

His instrument is primitive enough. It is composed of a bag of tanned goatskin, a mouthpiece consisting of a reed fitted into the leg-bone of a heron or flamingo, and twin pipes of bamboo, each perforated with four holes for stops and capped with the tip of a cow's horn, from which is usually suspended a written charm enclosed in a flat silver case. Bu Shkeywa, as the piper is termed, is greeted with delight in an oasis, and many an Arab who served France during the War has told me with what joy and astonishment he heard a somewhat similar instrument when he first beheld Scottish regiments at the Front.

As may well be imagined, a people who find it necessary to protect their musical instruments by means of charms do not neglect to provide their persons with similar protection.

The Shawiya are by no means less superstitious than the Arabs. Accordingly scribes who prepare written talismans and foretell the future with the aid of ancient magic books, sorceresses, and diviners all prosper greatly among the Berbers of the Aures.

Dread of the "evil eye" induces the hill folk to provide themselves, their animals, and their property with an enormous variety of charms. Of these the silver representations of the human hand with extended fingers (so commonly worn by the women all over Algeria) and the gleaming white skull (or, sometimes, merely the jawbone of an animal) to be seen suspended from fruit trees and the roofs of houses are but a couple of

examples. Magic and the wearing of charms, too, are very extensively employed for the prevention and cure of diseases, nearly all of which are popularly supposed to result from the machinations of some evilly disposed demon or "jinn." Thus, for example, women are to be found wearing the body of a scorpion enclosed in a reed to frighten away from an expected infant the "jinn" which has caused their previous children to perish at their birth, and the heads of chameleons, pieces of iron or

Fig. 2.—Shawiya women wearing silver charm cases.

copper, or packets of evil-smelling asafœtida are hung upon the person to protect the wearer from the attacks of the demons of disease.

At the foot of the Aures trachoma is magically treated as follows: A scribe skilled in the magic art writes certain words believed to be drawn from the Koran upon a piece of unlined paper, using a mixture of saffron and rose-water as his ink, and leaves the paper for one night exposed to the light of the stars. Next day the writing is washed from the paper in water, and this water, mixed with saffron, is used for the writing of further magic words between the hours of nine and ten in the morning. Upon the following day, at the same hour, the paper is enclosed in a fragment of the skin of a gazelle which has been killed by

the cutting of its throat in the name of Allah, the orthodox Mohammedan fashion, and the charm is worn attached to the right upper arm of the patient.

This custom appears to be a curious mixture of religious belief and sympathetic magic, for doubtless the beauty of the gazelle's eye was originally supposed to influence the disfigurement of trachoma.

Sympathetic magic, too, may well be the reason underlying the custom of some Shawiya mothers of taking children who are late in talking to a water-mill, such as I have already described, and causing them to drink of the spray which flies from the revolving wheel, doubtless confident that the roaring of the wheel may exert some influence to break the silence of the children.

In an area in which magic is thus regularly resorted to in order to combat disease, the traveller may well be astonished to find not only

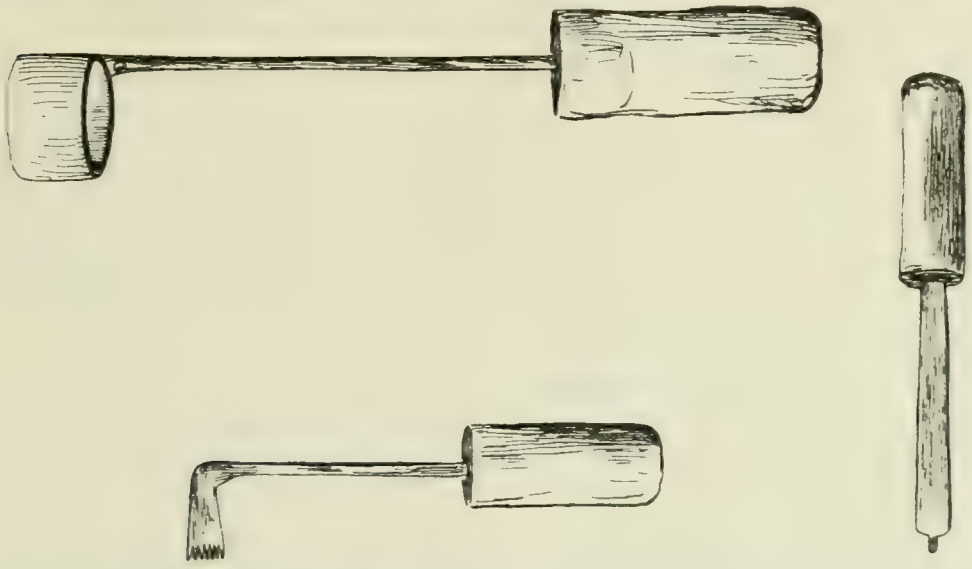


Fig. 10.—Shawiya surgical instruments: upper figure, trepanning scalper; lower, trepanning saw; to right, trepanning drill.

real surgery of a very remarkable if primitive kind, but also a genuine medicine carried on by families in which these arts have been handed down from father to son, by oral tradition, for many generations past. Yet such families are to be found, not only all over the Aures massif but in the tents of the Arab nomads in the plains beneath the hills.

It has been known for many years that surgery is practised by the Shawiya of the Aures, for individual natives bearing scars resulting from operations, particularly from trepanning, have frequently been observed by French administrative officers. Under French law, of course, the performance of an operation by a native not possessed of the necessary French qualification is prohibited, and the person contravening this law must necessarily be held responsible in the event of his patient's death. In these circumstances the Shawiya surgeons of the Aures have taken every precaution to prevent their identity from being disclosed to the authorities and to cloak their art with a veil of the deepest secrecy.

A detailed study of their methods, therefore, has for long been impossible. By a stroke of rare good fortune I was able, shortly after commencing my ethnographical researches, to make friends with a native surgeon of wide reputation, and later, when it was discovered that I could be trusted not to betray the names of my informants, I gradually became acquainted with many, if not all, of the best reputed practitioners in the hills.

From them I gleaned a very considerable amount of information as to their methods, some of which I have described before the History Section of the Royal Society of Medicine (*Proc. Roy. Soc. Med.*, 1920, vol. xiii.), and in my recently published *Arab Medicine and Surgery*. This information, with the ocular proofs which I was able to obtain, clearly shows that not only is trepanning successfully performed by the natives, but that bone taken from freshly killed animals is inserted in limbs in which bone has been shattered by, say, a gun-shot wound, and intricate operations are performed upon the eye.

All this is carried out without the use of anaesthetics, and with a disregard of surgical cleanliness which causes the European observer to marvel at the success which is undoubtedly attained. With regard to trepanning, it is remarkable in a land of superstition such as the Aures that the reason for the operation is the practical one of removal of bone damaged by a blow, and *not* a magical attempt to release a harmful demon supposed to be enclosed within the skull, as, I believe, is the case among certain peoples of the South Seas.

The fairly detailed examination which I was enabled to make of surgery and medicine in the hills appears to indicate beyond doubt that these arts, as now practised, crept into the Aures from without in the Middle Ages and that they represent survivals, probably but little altered in the lapse of time, from the healing art of the great Arab practitioners of the thirteenth and subsequent centuries. This view is supported by the Arabic books upon medicine which many Shawiya possess, though certain of their most successful doctors are quite unable to read them. Thus we find in the hands of Berber doctors the works, in manuscript or in the form of reprints obtained from Tunis, of such mediaeval authorities upon the healing art as Ibn el Beitar, the son of a Moorish veterinary of Malaga in Spain, a thirteenth-century botanist and pharmacologist whose extensive travels in Barbary and the East enabled him to add a number of items of materia medica to those which he borrowed from the Greeks, especially Dioscorides and Galen, for the compilation of his work on Simples, and the Sheykh Daoud ben Omar of Antioch, a famous writer of works upon medicine who lived in the sixteenth century.

To the mediaeval Arab savants, therefore, must, I think, be attributed the medicine practised in the Aures to-day. The modern Shawiya doctor is a skilled and experienced botanist, collecting the greater part of his material from the plant-life of his native hills, though some drugs and dried herbs he is compelled to purchase secretly from native traders in such centres of civilisation as Biskra or Batna.

Of more than one hundred and seventy specimens of their materia medica which we collected (with their uses), and which have been identified in England, at least one hundred and twenty consist of herbs or substances obtainable in the Aures.

I found that several doctors of the mountains were in possession of an apparatus of which I have as yet been unable to trace either the origin or the approximate period of its introduction into the Aures. I refer to a small and primitive form of "still," of which I was lucky enough to obtain a specimen. It had been secretly made in a large town to the order of a practitioner from the hills, who caused it to be copied in tin from a copper specimen, now damaged, which had been handed down to him by his uncle. Both the receptacle for containing the materia to be distilled and the condenser are of the same metal, and the apparatus, which when in use is placed upon an earthen bowl containing a charcoal fire, appears to be well suited for the distillation of such material as the Berber doctor requires; for example, for the preparation of a distillate of the plant *Artemisia herba alba*, much esteemed by the natives as a digestive.

From the very few examples which I have endeavoured to describe in the space of a short paper on the arts, crafts, and superstitions of the Shawiya as these may be observed to-day, the conservative influence of the geography of the country upon the culture of its inhabitants is, I hope, clearly revealed.

When once an art or craft or custom, doubtless at first regarded as an innovation to be treated with suspicion, has been allowed during the progress of the ages to pass the forbidding outer barriers of the massif and to take root among the mountaineers, that art, craft, or custom seems to have flourished to this day in the form in which it was originally introduced. For the recurring periods of conquest which have convulsed North Africa, sweeping away so many traces of the past from the fertile areas of Algeria, have failed to overwhelm the culture of the Shawiya in their secluded and almost inaccessible valleys beneath the towering Aures crags.

In conclusion I should like to offer my very grateful thanks to the French officers and officials in Algeria, to whose kindly co-operation and assistance are largely due any results which our researches may have yielded.

Instructed by their Government to facilitate as far as possible our various expeditions, these gentlemen have interpreted their instructions in so liberal a sense that difficulties vanished from our path as if by magic, and we have become indebted to all the military and administrative officers with whom we came into contact for innumerable acts of kindness and hospitality for which it is difficult adequately to express our gratitude.

PORTUGUESE NYASALAND.

By Robert R. Walls, M.A., B.Sc.

Portuguese Nyasaland is one of the least known of the African territories, and, in spite of its accessibility, is a retrogressive state among thriving and progressive neighbours. It lies between the 11th and 14th parallels south latitude, and extends from the Indian Ocean to Lake Nyasa. It is the most northern part of Portuguese East Africa, and has an area of about 80,000 square miles. It is separated from the Tanganyika territory in the north by the River Rovuma and from the Portuguese province of Mozambique in the south by the River Lurio.

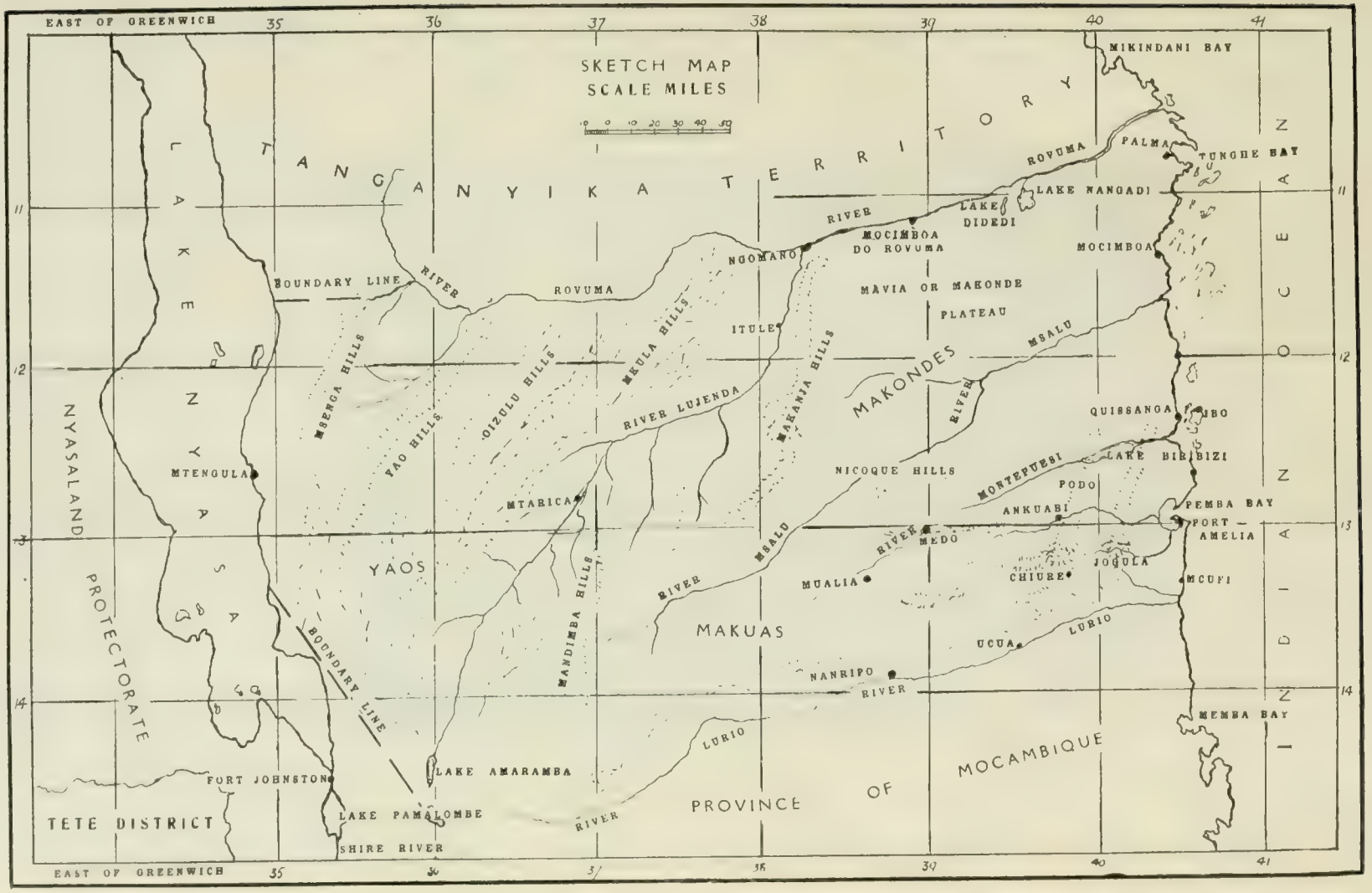
The country was first made known to Europeans by David Livingstone, who journeyed up the Rovuma on the old slave-traders' route to Lake Nyasa in 1862. Joseph Thomson also took this route when exploring the country on behalf of the Sultan of Zanzibar in 1881. Since then most of our knowledge of this country has come from members of the Universities' Mission to Central Africa and from the Bulletins of the "Compagnie do Nyasa" who administer the territory. All information to date regarding Portuguese East Africa in general and Portuguese Nyasaland in particular was published in the *Manual of Portuguese East Africa* and the *Handbook of Portuguese Nyasaland*, by the Naval Intelligence Division of the British Admiralty, in 1920, while the present writer was still engaged in his explorations. This description will therefore supplement these excellent summaries.

Geology.

The geology of Portuguese Nyasaland is by no means easy to map out. A light sandy soil covers the whole country, and on this a thick tropical vegetation grows, through which native paths twist and twine to the bewilderment of any person trying to map out a course accurately. Here and there mountains rise abruptly from the level sandy plain, in some respects like the koppjes of South Africa, but over great stretches the geological structure is obliterated by the soil and the dense tropical bush. Along the coastal area rocks of recent or Tertiary age appear. These are coral rocks, calcareous sandstones, and soft muds. This coastal strip is narrow, however, never more than twenty miles across, except perhaps in the region of the lower Rovuma, and immediately after this strip is crossed rocks of very much greater age appear, mostly early Palaeozoic.

The rock outcrops of the interior are all of the nature of isolated mountains, or Inselberge, and may rise to a height of several hundred feet above the general sandy level, or may appear just a few inches above the soil and be marked only by the natural clearing in the bush. The Inselberge may be classified geologically under four heads: (1) Isolated bosses of granite; (2) Steeply folded mountains of gneiss and schist;

PORTUGUESE NYASALAND



From *The Geological Magazine*.

(3) Slaty conglomerate of quartzite, and (4) Boulder mountains. The granite bosses are fairly common, and in all cases examined by the author intrusive into the surrounding rocks, though occasionally they showed signs of having been folded up with the surrounding rocks by subsequent compression. Folded gneiss and schist form the longer mountain ranges, but as a rule these ranges are not continuous but marked by a number of isolated humps in line with one another. The third type occurs most frequently in the south in the valley of the Lujenda, while the fourth type occurs where regional compression has taken place in two or more directions not in line with one another, and the rocks have broken up into huge boulders piled on top of one another.

Except along the coastal area the rocks of the entire country are highly metamorphosed and show signs of having been subjected to great regional thrust movements. They appear to be of the oldest Palaeozoic formations, and in spite of numerous statements to the contrary to contain no minerals of economic importance. In the south-eastern portion of the territory, where the author conducted his explorations, two steeply folded north-south ridges occurred parallel with the coast and about twenty and forty miles inland respectively. Thereafter the ridges ran east-west at right angles to the former, and where the two cobble-shaped boulder mountains and masses of intrusive granite occurred. The folding of the metamorphic rocks over the rest of the country is said to be indicated by the mountain ranges in a like manner, but no exact mapping work has been done. These ranges are shown in the map attached, which is copied mostly from that in the Admiralty's *Handbook of Portuguese Nyasaland*, and is perhaps the best that can be constructed from our present knowledge.

The only noteworthy minerals in these early Palaeozoic rocks are the thin seams of coal known to exist near Itule on the Lujenda. Practically all that is known of these coal seams is found in the report of Joseph Thomson. The coal is of poor quality, the seams are small, and of practically no commercial importance. It is an interesting point, however, that these rocks may be of true Carboniferous age. Thomson supposed that they were, and that they were let down into the older Palaeozoic rocks by trough faulting, but he evidently made no attempt to map out the country carefully. It should be noted that the phenomenon of trough faulting and rift valleys in this longitude has been taken up since Thomson's time, quite independently, but the matter has not yet received the full attention it deserves. If the geology of the south-eastern portion examined by the present author is characteristic of the whole territory—and we have no reason to assume otherwise from the numerous descriptions of travellers—then we have here a highland country exactly similar to the Highlands of Scotland, where the mountain ridges and river valleys are parallel to the foliation of the rock generally. It will be noticed by reference to the map also that the huge valley of Lake Nyasa lies parallel to the lines of foliation as marked by the mountain ridges, and the origin of this great lake is therefore more than

suggested. Evidences can be produced indicating that the great earth-thrusts which produced this foliation of the rocks, or at least one phase of these thrust movements, is of recent geological date and may, in fact, be still going on. It is not improbable, therefore, that rocks of true Carboniferous age may be folded into the complex as Thomson suggests.

It must be noted that the few small seams of coal at Itule are all that are definitely known to exist, although fantastic stories of rich coal-

FIG. 1.—Contorted quartzite, showing the extent to which the rock has been folded in earth movements.

fields elsewhere in the country have been published. Numerous prospectors have searched the country more or less thoroughly without finding any justification for these stories. In justice to the Portuguese, it must be stated that the Government officials in the country are not responsible for the propagation of these fictitious reports of minerals, which have really originated from the spasmodic efforts of company promoters.

The rocks over the whole country are highly metamorphosed, and even the coal at Itule has suffered in the general metamorphism. It is probable that the bitumen found in the river valleys of the Lujenda and Rovuma below Itule come from the metamorphosed seams of impure coal

in the same region. There is no proof whatever that beds of undoubted Carboniferous age are found elsewhere in the country. The rock of the whole country is essentially gneiss.

Overlying the basic gneiss in the south of the territory are immense beds of quartzite or banded jaspers. These jasper beds fill the entire basin of the Lurio. In the gneiss of the rest of the country occasional bands of schist are found of which only the graphite schist need be mentioned. This graphite schist appears in the Medo region in such quantity as to invite commercial exploitation. The amount of grit in the graphite, however, destroyed its value, and the attempt to work it was abandoned. The only other mineral which need be mentioned is the iron ore which occurs in great bands in the gneisses and quartzites. The amount of iron in the country is prodigious.

The country, then, owes its physical features to a great compression thrust coming from the south-east direction. It is more probable that this thrust could on examination be resolved into two thrusts coming from the south and east respectively. The folds meeting each other at right angles in the south-eastern part of the territory suggest this, and also there is much local evidence that the latter thrust movement is still going on. But these great thrusts which threw up the ridges also threw up the shallow water deposits of the coastal area, for all the Tertiary deposits in this area are of the nature of raised beaches. These Tertiary deposits have not been folded into the general metamorphic complex of the older Palaeozoic rocks, but retain more or less their horizontal bedding with a marked unconformity to the ancient underlying rocks.

This Tertiary beach has by no means been raised equally over its entire length; it is humpy and broken and cut by innumerable faults, suggesting that it is being raised on the growing folds of the hard strata beneath. In other words, the beach is high on the anticlines and low in the troughs. In some parts the action of percolating water has dissolved the lime and recemented the grains into hard, compact rock, but for the most part the material of the raised beach is more or less unconsolidated.

The whole of the coastal strip owes its features to irregularities in the uplift of the shallow water deposits. In particular the great harbour of Pemba Bay owes its origin to the uplift of its eastern arm, which is marked by well-defined fault lines, and near these fault lines on the eastern arm of the bay the deepest water is found. The raised beach here is nearly three hundred feet above the present sea level. The raised beach of the whole coastal strip is composed of coral rock, shelly limestone, calcareous sandstone, and soft, unconsolidated mud. This latter greenish mud is typical of the mud of the present-day mangrove swamps, and seems to indicate that in recent geological times the belt of mangrove swamp was much more extensive than at present. This in turn suggests that the river drainage of the country was also very much greater, a suggestion which is borne out by much independent evidence which we shall discuss later.

The fundamental rocks of Portuguese Nyasaland, therefore, are gneiss

and quartzite with a little granite and schist. But the country owes much of its characters to another geological factor, viz. the weathering of these rocks. The rainy season is very short, the country is very dry, and water plays a quite unimportant part in the disintegration of rocks. The great factor is insolation, the breaking down of rocks by expansion and contraction due to alternate heat and cold. Under the effects of insolation the rocks break off in layers parallel to the surface, and often disintegrate with a noise like a pistol shot. This gives rise to coarse sand and leaves a perfectly smooth contour behind. Almost all the outcrops of rock thus present smooth whaleback contours, and it is often impossible to break off a specimen with a geological hammer for lack of

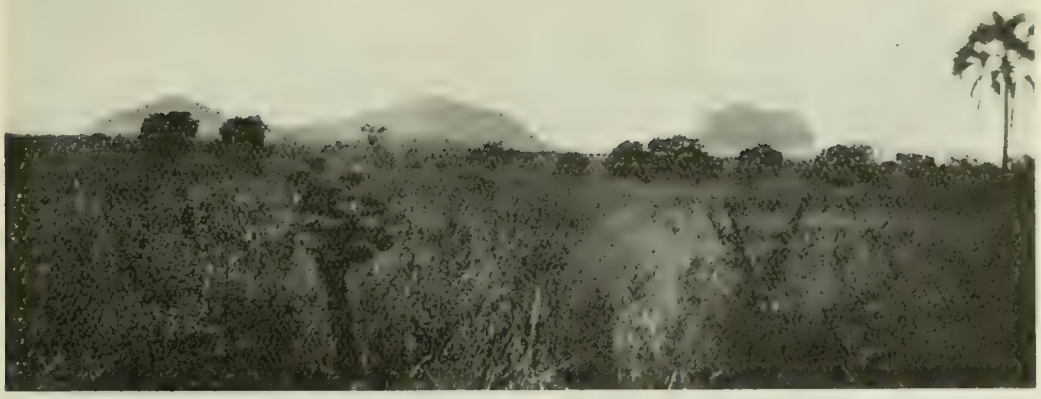


FIG. 2.—Looking south across the valley of the Lurio; folded mountains of Mozambique in the distance.

a projecting corner. The coarse sand is produced in immense quantities and fills up all the valleys.

The rivers, which only exist for a few months in the rainy season, cannot remove this sand, and the river valleys are choked with it. The sand is, in short, levelling up the country again and obliterating the original corrugation of the land. The mountains appear much smaller in proportion to the filling in of the valleys. The mountain ridges, as has been already said, now appear only in isolated masses, and may be compared to petrified whales in a sea of sand.

This sandstone is in places solidifying again and can sometimes quite properly be termed rock. It is, however, characterised by more or less horizontal bedding with a marked unconformity to the older rocks beneath. When the banded iron ores, which are so abundant in all the original rocks, have disintegrated this new sandstone is coloured red, and

as it is very coarse with occasional boulders, it is no doubt the ferruginous conglomerate to which Livingstone refers as capping the older rocks. This ferruginous rock is then really rainwash from the mountain slopes, and it is from this that the natives collect the various iron ores. With the possible exception of the raised beaches on the narrow coastal strip the author has never seen one case where the ferruginous conglomerate actually "capped" a mountain.

Climate.

The climate of Portuguese Nyasaland is naturally very hot, though tempered to the traveller by the thick screening vegetation. The rainy

Fig. 3.—Natives digging iron ores from the rainwash in the synclines.

season is very short, seldom extending beyond the months of January and February, but the rains are comparatively heavy while they last. The rainy season is also the hot season. The older white inhabitants declare that the rainy season, on the coast at least, is now much shorter than it used to be within their memories, and, although this cannot be substantiated by actual measurements, that the rainfall is much less. Agriculture is now diminishing in proportion as the dry season is extending. It is only in a few isolated localities that any water at all can be obtained during the last six months of the year. Along with these statements must be taken the reported fall in the level of Lake Nyasa within the last fifty years (or perhaps less) and the choking up of the Shire river with sand to the detriment of river traffic. All the harbours and river mouths from Durban to Zanzibar are likewise being choked up

with sand, and this will seriously affect the economic development of this coast.

The climate though very hot is not unhealthy, chiefly owing to its dryness. Mosquitoes are almost unknown over the greater part of the year, though during the rainy season they are very troublesome. White settlers are more liable to suffer from the lack of water than from the insect-bites and fevers of well-watered countries. It is just possible, of course, that the introduction of an irrigation system, which would be the first necessity of a colonial population, would increase these evils. The country is not too hot to make an excellent colony, if properly managed, for the Portuguese and other races of the south of Europe.

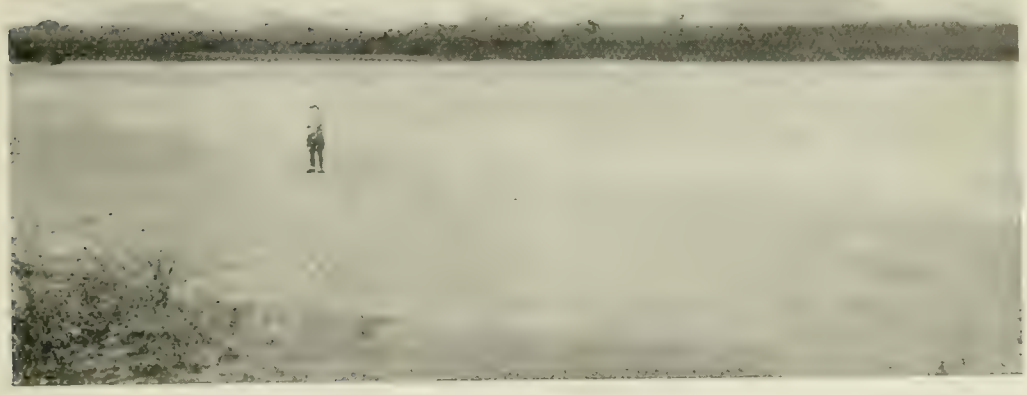


Fig. 4.—The valley of the Lurio in the dry season.

We cannot leave the subject of Climatology without mentioning the terrific cyclones which ravage the country periodically and cause fearful damage to life and property. The low shelving coastline with its numerous sandbanks and coral islands is particularly dangerous to shipping on these occasions, and even Pemba Bay could not by any means be regarded as a harbour in which to weather out a storm.

Relief and Drainage.

The surface relief is simple. The map is by no means accurate, but it gives us at least the approximate position and line of the chief mountain ridges and rivers. The country rises gradually to the eastern shore of Lake Nyasa, and the mountains project as isolated masses from the general sandy level. The chief rivers are shown, but only the

Rivuma with its tributary the Lujenda in the extreme north, and the Lurio in the extreme south, contain running water all the year round. The other rivers only flow for about two months during or immediately after the rainy season. Few contain even stagnant pools of water by the month of June, but owing to the huge quantities of sand which choke their beds, water can often be obtained by digging in their courses. Thus the author was able to obtain water for his carriers in July by digging about eight feet into the sand in the bed of the Maguidi river, which flows into Pemba Bay.

It is highly probable that water could be obtained more generally over the whole land by studying the sub-arenaceous contours of the hard metamorphic rock, and digging into the sandy soil, but no serious attempts have been made by Europeans, although a few native wells are made in the sand (Fig. 6, p. 180). The river valleys are wide and seem to suggest an immense drainage at one time. For example the valley of the Lurio river, less than a hundred miles from its mouth, is one and a half miles wide, yet in July the trickle of water that flowed down was less than twenty feet across and nowhere ten inches deep. The natives use dug out canoes on the rivers, but needless to say the latter are practically useless for navigation, and the banks formed by the huge quantity of sand carried down render their mouths useless as harbours.

The coast of Lake Nyasa has remained practically undeveloped by the Portuguese. The Indian Ocean coast is shallow, with numerous coral islands and sandbanks, and mangrove swamps marking the mouths of all the rivers. It contains, however, the unique harbour of Pemba Bay with an area of about twenty-five square miles, of which perhaps one-third is useful for sea-going vessels. It appears to be silting up on account of the large quantity of sand brought down by the Maguidi and Mhesi rivers in the wet season, and the mangrove swamps are rapidly encroaching on its western and southern shores. There are several dangerous shoals and sandbanks in the centre of the bay also, and the harbour is only safe and deep close to the fault-lines on the eastern arm of the bay.

Agriculture.

The light sandy soil is very productive, but only during and immediately after the wet season. Practically all tropical products can be grown when water is supplied. But the natives have neither sufficient initiative of their own, nor encouragement and help from their Portuguese masters, to enable them to grow even enough for their own requirements during the short period when cultivation is possible. Thus the Indian traders who are settling here in considerable numbers have conferred great benefits on the country, for they have built barns and store the food at various centres. It is extremely profitable to them also, as they buy from the natives very cheaply just after the wet season when food is plentiful, and sell at any price later on in the dry famine season.

History.

So much has already been written elsewhere of the history of Portuguese Nyasaland that only the briefest summary need be given here. There is practically no history of this territory in early times, while regions farther south and much more inaccessible were known to the Phoenicians for their natural riches. The Arab fleets established ports of call and initiated a spasmodic trade probably about the tenth century. But no real interest was taken in the country until the great white invasion of the Dark Continent. In the general scramble amongst European nations for territory in Africa this region became Portuguese because of an early sixteenth-century settlement on the island of Ibo.

Ibo might very well be compared with Mozambique. Both are small settlements built on islands in shallow water and quite unsuitable as modern ports. They were eminently suitable as ports of call, however, in the early days of Portuguese maritime enterprise, the tiny barques of these daring explorers being able to come close inshore on the high tide. Both islands were fortified, and were much safer than settlements on the mainland would have been. Food and fresh water could be obtained there, without which the long journey to India would have been impossible. The Portuguese, however, took little or no interest in the hinterland until about forty years ago, when the Portuguese right of priority to this territory was recognised. But the Arab influence has always been the dominant one, and has stamped far more lasting effects on the natives and customs than the Portuguese. The Arab influence is most conspicuous along the old trade-routes, *e.g.* on the coast and along the Rovuma and Lujenda to Lake Nyasa. It is only along these routes that the natives have any real idea of agriculture, trade, organisation, and self-preservation. The natives in these districts are still mostly Mohammedans. During the Arab aggression Portuguese authority was maintained on the island of Ibo by the establishment of two forts, which still exist. Within the last thirty years some slight attempt has been made to extend Portuguese influence over the whole country, but these attempts have been confined to the erection of a few isolated stations or "Bomas," and an attempt to extend the hut tax without in any way compensating the country for the imposition of this tax. The outposts consist usually of a mud hut, the residence of the Portuguese chief, and maintain a few *sepaies*, or native soldiers, who collect the local tax.

Inhabitants.

The inhabitants of Portuguese Nyasaland belong to many mixed races. The white population is, of course, chiefly Portuguese, though many have lived out there several generations and are therefore true colonials. The Portuguese also intermarry with the native races, and half-breeds are common. There is much Arab blood also intermixed with the native races, especially in the coast areas and along the Rovuma

traders. The bulk of the present trade of the country, however, is in the hands of the Indians, and such progress as has been made within the last few years is due entirely to these Indian traders. They have depots at all the principal points on the coast, and stores and sub-depots at all the principal villages inland.

Indians stand the climate much better than the white races, and they understand the native mentality and acquire the native language to a far greater extent than Europeans attempt to do. They are thus able to turn the labour of the natives to far greater advantage and profit, and have almost completely won the confidence of the native races. Though these Indians are not perhaps the best colonisers themselves, yet by their initiative and energy they have wonderfully improved the lethargic native races, and such arts as are now practised by the natives are generally of Indian origin.

The natives belong to several tribes distinct from each other in appearance and language. None of these tribes is large, however, and most are of a very degenerate type. According to the best sources of information the native population of the whole territory is estimated at only half a million, and it would appear to be steadily diminishing. The population was much greater when the country was first visited by Livingstone in 1862, but Livingstone remarked even at that time on the fact that the land had evidently supported at one time a much larger population, and he accounted for the diminution by the intertribal wars and the slave trade. This, of course, cannot account for the disappearing population at the present day.

The dominant native race is the Yao, who with the sub-tribes with which they are now practically fused occupy the western half of the territory, the Lujenda and Rovuma basins. They were formerly a very aggressive people, and traded in slaves and merchandise with the Arabs, from whom they acquired many of their characteristics. They profess Mohammedanism, and their houses are much better constructed than those of the other native tribes in this territory. The Yaos have much finer features, and adopt the Arab type of dress and ornaments.

The Makua tribe form the bulk of the native population which is at present amenable to Portuguese rule. They are rather a degenerate race without much initiative, and would probably have been wiped out but for the protection of the European races. They perform practically all the labour of the country, and seem to be better adapted for slavery than any other form of government. They are practically treated as slaves by the Portuguese, being rounded up and compelled to work by native soldiers. The pay when they receive any is wretched, one half-penny per day being the standard at the rate of exchange in 1921. Naturally they cannot afford to wear cloth. Their clothing consists usually of a girdle of bark-cloth which they prepare themselves from the baobab tree. They are quite incapable of long-continued labour or concentrated application, but seem quite contented with their lot as slaves if they are only fed. They grow a little grain in the rainy season but

not nearly sufficient to last them throughout the year, with the result that they are practically starving for six months. The Makuas are said to eat their dead during this time, and the writer, from his experience amongst them and knowing the severities of the annual famines, has no difficulty in believing this. Strange to say, the Makua women have a much higher social position than those of other races, and the chief or "Jumbe" of the small scattered settlements is occasionally a woman. This is remarkable among African tribes. All the Makua women wear

FIG. 5.—A Makua woman of the better class—a chief in one of the minor villages.

the pelele, or "kipini" as they call it, through the upper lip (Fig. 5). The Yao women wear it through one nostril.

The only other tribes worth mentioning are the Makondes and Mavites, neither of which is large or important. The former is said to be an offshoot of the Makuas and is even more degenerate. Its members are distinguished from the Makuas by the fact that the hair generally grows longer. The Mavites occupy the coastal plateau between the Rovuma and Msalu. They are said to be shy, distrustful, and treacherous, and of little or no economic value as a source of labour, although strange to say they do work for the Indian traders. There are several other

smaller tribes in the territory which are now more or less fused with the newcomers.

LANGUAGES.

Naturally enough, with so many tribes originally separate and distinct, the languages, or rather languages, are a great problem. Each tribe has its own particular language, and there are even dialects within each tribe which to European ears sound like different languages entirely. To make matters worse, Swahili, the *lingua franca* of so many of the black races of Central Africa, is not spoken anywhere and only very imperfectly understood in the few places where Arab influence has survived. Most of the blacks speak at least one language in addition to their own, however, and a language is arising now which appears to be a fusion of several native languages. The most important native language is that of the coastal region, commonly called Kimwané, which is distinctly a fusion of several others. About twenty per cent. of the words are Swahili in origin, and an even greater proportion appears of Hindoo origin. There are many words of Portuguese origin also, and the rest of Kimwané is native.

It is difficult to know how the name Kimwané has arisen for this patchwork language, as there is no Kimwané tribe. The writer supposes that the word comes from *Ki monhe*, *Ki* meaning language in Swahili and some of the native tongues, and *Monhe*—pronounced *Monyay*—being Portuguese for an Indian trader. It seems more than likely that this is the bastard language spoken by the Indian traders who have so much influence over this district, and the name, therefore, is as much a hybrid as the language itself.

The Makua language ranks next in importance, being the language of the bulk of the labour of the country. It is very crude, however, with a very limited vocabulary and an exaggerated wealth of dialect. As in most other native languages, the Makua only count up to ten, and the following are their names for these numbers :—

Nloco, one.	*Mtanu na moky*, six.
Mosa, two.	*Mtanu na medo*, seven.
Mararu, three.	*Mtanu na mararu*, eight.
Mashessé, four.	*Mtanu na mashessé*, nine.
Mtanu, five.	*Nloco na moja*, ten.

The Makuas, however, are rapidly acquiring the Portuguese tongue, and all the better class of labour understands Portuguese.

The writer had no opportunity to study the Yao language. Though it is not yet by any means universally understood, Portuguese is the only language which the traveller need attempt to learn for this country, although Swahili could be used in the coastal regions and along the old Arab trade-routes where interpreters might be found. In contrast to Lourenço Marques and Beira, the English population in Portuguese Nyasaland is negligible and the English language nowhere understood.

Customs and Crafts.

The natives have no arts. Their houses are of bamboo covered with mud. Corn, which forms the native food, is bruised in a wooden bowl and then ground on a flat stone by women. The "batuques" or native dances are very crude imitations of the war dances of the Zulus and Matabeles. In one or two localities the natives smelt the iron ores with wood charcoal and make iron spear and arrow heads and axes, which they tie to a stick with a thong or fibre. The iron is very soft, and as weapons all these are practically useless. A knowledge of decoration can scarcely be said to exist, and their greatest ornament is the kipini, thrust through the lip, nose, or ears of the women. Arab weapons are still found and imitated along the old slave-routes however, and Indian art is becoming more common in the coastal region.

Administration.

The country is managed and governed by a chartered company,—the Compagnie do Nyasa,—which has now been in existence about thirty years and is very similar in its constitution to the historic British East India Company. Now the question of the ability of a chartered trading company to develop and administer a colony is one which has already been discussed *ad nauseam* without any definitè conclusion being arrived at. In the case of Portuguese Nyasaland the result has been disastrous, more from a combination of all the factors than the failure of any one in particular.

The chief function of a company is to produce dividends, and a country which is to be managed by a chartered company must have natural riches which can be tapped quickly and easily. Part of the wealth so obtained can then be reinvested in the opening up of the interior, the development of other latent sources of wealth, and the formation of a strong administrative and executive government. Unfortunately Portuguese Nyasaland is a decidedly poor country with practically no natural resources capable of making an early return for capital expenditure. Here, then, we have an explanation of the backwardness of this territory. Portuguese Nyasaland would probably have developed, even under a chartered company, much quicker than its neighbours had there been any natural wealth to give a quick return for capital expenditure and so attract a European population. There is practically nothing to show in the whole territory for all the money expended upon it up to the present, and the total revenue from the whole territory cannot pay the administrative expenses of the company.

According to their charter the Compagnie do Nyasa were obliged to develop the country, to build a railway, to make roads, found schools, to build the city of Port Amelia on Pemba Bay, and set up a proper system of government, with courts of justice, etc. Yet none of these things has been accomplished. A half-hearted attempt has been made to

build a city at Port Amelia, but owing to the unstable nature of the foundations on loose recent sandy deposits, and the terrible cyclones which ravage this district every few years, the town has been practically wiped out of existence. Although Pemba Bay is a port of call for steamers, there is no accommodation for visitors and no facilities for landing passengers. It would indeed be highly desirable to build a city on this proposed site at Port Amelia, but the buildings would require to be constructed of stone and to be very substantial to withstand the repeated cyclones.

Ibo remains the only town in the whole territory, and there ocean steamers cannot get within two miles of the island on account of the shallows. Owing to the rough weather also it is often impossible to land passengers or cargo, and there is consequently much loss and delay in transit. Without natural resources to tap there is no inducement to build a railway nor to make roads. The population is too poor and scanty to be a real economic asset. The chief sources of revenue to the company are taxes, especially the hut tax, but with little or no creation of wealth within its own bounds the effect of taxation is but to bleed the country to death.

During the War much money was expended on this territory and much development and improvement were carried out. Good roads, suitable for motor transport, were cut through the bush, a steam sawmill was put in operation, bridges built, telegraphic communication established, a hospital was built in Pemba Bay, and a water supply established for Port Amelia. A station for the Great Eastern Cable Company was built on Pemba Bay ; a wireless station was also put in operation, a pier was built at which dhows and tenders could load or discharge cargo at all states of the tide, and the dangerous shoals in Pemba Bay were marked by buoys.

But the Compagnie do Nyasa, either from incompetence or financial reasons, have utterly failed to keep up these developments. A cyclone in December 1920 destroyed the hospital and almost all the houses in Port Amelia, as well as the pier. Landslides of the loose, unconsolidated materials of the raised beach have destroyed the tanks of the water supply system and much of the retaining walls which held up the sand on the proposed site of the town. For lack of means to support them the cable and wireless stations have been demolished and telegraphic communication has disappeared except for a precarious line along the coast. For lack of attention the steam sawmill has rusted into decay, and the buoys which marked the shoals in the bay have long since disappeared. The natural, extraordinarily rapid growth of vegetation in the wet season has obliterated the roads, and the bridges were washed away when the water came down the rivers. Yet all these improvement works must be re-established before development work can begin, and this means again an enormous expenditure from capital account. There is now practically no motor transport possible in the country, and all travelling must be done with negro porters.

The policy of the Portuguese is not to educate or enlighten the native, but to keep him as a source of manual labour pure and simple and to treat him practically as a slave ; and with the low degenerate type of Makua native, this is to a large extent inevitable. This policy has been commented on both favourably and adversely by other writers. The natives are rounded up by black soldiers and compelled to work. The rates of remuneration paid to the natives and also to the officials of the Company are scandalous when the low rate of exchange of Portuguese currency is considered, and quite inadequate to live on. The Company's officials, therefore, compel the natives to work for them often without payment at all, and there are no courts of justice and no redress for the natives. Bribery and corruption are rampant, and as there is no strong executive government there is little hope for the development of this territory.

In summing up these various points, it will be seen that Portuguese Nyasaland is unsuitable for development by a chartered commercial company. It can only be developed properly by a wealthy, benevolent power, able and willing to sink vast sums in improvement and public works, and to help the native population many years before any return on capital expenditure is looked for. It might indeed be said that the country requires the services of a wealthy and practical missionary society before anything else.

Resources.

The resources of this territory are potential rather than real. The great drawback to the whole country is the lack of water, and the fact that not sufficient food is grown in the short rainy season to last the native population throughout the year. The natives die of starvation by thousands every year. The first step in the development of this country must be to look after the native population, the only possible source of labour and consequently of wealth in the country. An irrigation system is the first consideration to conserve the water supply. Food must be grown in greater quantity, and husbanded over the dry season. The natives must be looked after and fed. The native population must be increased, as at present it is quite unequal to the labour demands of the territory. The black population will rapidly increase when food and water are assured for the whole year round.

Mineral wealth practically does not exist. With cheap labour the graphite deposits might be worth developing in a small way. There is very little building stone, except for the calcareous sandstone of the coastal area. There is abundance of coral rock on the coast, however, which can be burned for lime. The mud of the raised beaches, which has its origin in the organic slime of the mangrove swamp, is useless for brickmaking, and the soil everywhere is too sandy for this purpose. Without coal it does not appear as if the immense quantities of iron ores in the country could be developed by Europeans. The pearl oyster

is found along the coast, but the pearls are small and of little or no commercial value. It might be possible, however, to cultivate the pearl industry under the charge of a biological expert. No such attempt has been made so far in this area.

The chief source of wealth of the country will be the cultivation of the rich, loose, sandy soil which is so productive when water can be supplied.

The baobab tree, so useful for papermaking, is found everywhere.

FIG. 8.—Native weeding in sandy soil in the bush country.

Ebony, mahogany, ironwood, and sandalwood trees are also common. The mangrove swamps yield bark valuable for tanning purposes. The coconut palm flourishes along the coast, and vegetable ivory is found in the Lurio district and might be more generally cultivated. Cotton is also found in the Lurio district and, to a lesser extent, in one or two isolated localities where water occurs. The same might be said of coffee, rubber, and tropical fruits such as cashew, custard apple, pomegranates, mangoes, citrons, papai, melons, tomatoes, bananas, as well as the native foods, millet and other fine-grained seeds, kaffir corn, Indian corn, mandioc, black beans, and pumpkins.

Earthnuts have been grown in considerable quantities, mostly by forced labour, and exported to Europe for the manufacture of margarine and oil, but the demand has decreased considerably within the last two years. Tobacco is being grown at present in some localities with a fair amount of success. Kapok, vegetable gums, and honey are often gathered by the natives of the interior and sold to the Indian traders. The country is much too dry at present for sugar and rice, and it is very doubtful whether sufficient water could ever be obtained for these commodities except perhaps in the Lurio or Rovuma valleys. Game of all kinds is fairly abundant, but migratory and uncertain during the long dry season. Lions, leopards, and hyaenas are very numerous and do terrible damage to the native population. Fowls of all kinds are found everywhere, and form the staple article of food of the white population almost to the exclusion of everything else.

It would indeed be difficult to say which products would be profitable and which not in this territory until actual experiments had been made. The lack of water has already caused the failure of many experiments to make agricultural products a commercial success. An irrigation system on a very large scale is the first real need of the country, but it is a difficult problem. Once the water supply is assured native foods must be grown. The native population must be fostered and increased, as no development nor increase of wealth is possible without a larger and more thriving source of labour.

The old, old project of building a railway from Pemba Bay to Lake Nyasa is being revived again at the present moment, and it is hoped that the mere building of this railway will be a panacea for all the backslidings of this territory during the last thirty years. The present plan is to make an immediate start and construct the first part of the line from Pemba Bay about a hundred and twenty miles inland. The futility of this plan is obvious, as there is no traffic in the country itself to support a railway. Even though the railway were carried right across to Lake Nyasa, it is doubtful if it could ever pay in competition with the Trans-Zambesi railway from Beira and the railway from Mozambique, both of which are already started. The country which could not keep up a few of the principal roads constructed during the War cannot be expected to keep up a railway.

MEMORIAL TO THE LATE DR. W. S. BRUCE.

[The following letter in support of a proposed Memorial to the late Dr. W. S. Bruce was submitted to the Council at their meeting on 9th May. It was resolved to express sympathy with the proposal, and in token of this sympathy to contribute Twenty-five pounds sterling towards the Memorial. The Council also directed that the letter should be published in the July issue of the *Scottish Geographical Magazine*,

together with a request that any member of the Society who might wish to contribute should do so through Mr. T. B. Whitson, C.A., 21 Rutland Street, Edinburgh, Treasurer of the Society.—ED. *S.G.M.*]

The memory of one who did so much for polar exploration as Dr. W. S. Bruce should not be allowed to fade as years go by. His contributions to our knowledge of Arctic and Antarctic lands and seas form his enduring monument. Any memorial in stone and mortar would be distasteful to his own disinterested and retiring nature. That his work should continue is all he would have asked.

Unfortunately, the time is unpropitious to appeal for the large sum of money that would be required to build and equip an Arctic scientific station on Prince Charles Foreland, Spitsbergen. But no happier monument to Dr. W. S. Bruce could be devised than such a station on the island which he first explored and where he spent several summers.

While this scheme appears unrealisable at present, the idea of a memorial should not be dropped. It is proposed to found a Bruce Memorial Prize to be awarded from time to time in recognition of some *notable* contribution to natural science in polar regions. The research may be in zoology, botany, geology, meteorology, oceanography, or geography, but must be in the nature of new knowledge, and must be the outcome of a personal visit to polar regions on the part of the recipient of the award. The recipient is to be of Scottish birth or descent, and, if possible, a young man at the outset of his career as an investigator. It is felt that these conditions are in accord with sympathies which Dr. Bruce frequently expressed.

In order to carry out this project a sum of £500 is aimed at, but more could well be utilised. The sum collected will be invested in the name of the Trustees. It is proposed to ask the chief learned Societies in Edinburgh to appoint a small joint Committee to select the recipient of the honour from time to time.

The award might well take the form of a bronze medallion bearing Dr. Bruce's portrait on one side and his own design for the "Scotia" medal on the reverse, together with a payment in cash. The latter would vary on different occasions, since there is no intention to award the prize annually, but only at such times as a valuable piece of research merits recognition.

Mr. A. N. G. Aitken, S.S.C., has consented to act as Treasurer, and subscriptions may be addressed to him at 37 Queen Street, Edinburgh.

(Signed) ALF. N. G. AITKEN. JOHN HORNE.
J. H. ASHWORTH. J. H. KENNETH.
R. N. RUDMOSE BROWN. J. MATHIESON.
W. G. BURN MURDOCH. J. ARTHUR THOMSON.

OBITUARY.

Henry Newton Dickson, D.Sc., C.B.E.

The death of Dr. H. N. Dickson at Edinburgh on 2nd April has removed from the field of geography one of the figures who can be least easily spared at the present moment.

Dickson was born in Edinburgh in 1866, and educated at the University there. Under Tait and Chrystal he became interested in physical science, and later pursued its applications in meteorology and oceanography under John Murray and J. Y. Buchanan.

In 1891 he proceeded to the Plymouth Marine Biological Station. Beginning with a large series of determinations of temperature and salinity of the waters of the English Channel, he enlisted later the aid of the officers of Atlantic liners, and extended his study to the whole of the North Atlantic. The result was the accumulation of an enormous mass of facts, the discussion of which occupied him until 1901, when his classical paper, "The Circulation of the Surface Water of the North Atlantic Ocean," was published in the *Philosophical Transactions*.

In the meantime, in 1893, Dickson had removed to Oxford, and when the School of Geography there was founded in 1899 under Mackinder, he became a member of the staff as lecturer on physical geography; and there he was awarded the degree of D.Sc. in physical geography. In 1906 he became professor of geography at Reading, where he remained until he severed his direct connection with academic geography in 1920.

The outbreak of war found Dickson unfit by age and training for combatant service. Nevertheless in 1915 he organised a geographical section of the Intelligence Division of the Naval Staff. As its value asserted itself, this grew into a large department in which the hardest of its workers was its chief. The resources of this department were called on for help in military and civil, as well as in naval matters, and a certain amount of its work has recently been published under Dickson's editorship in a series of manuals on various parts of the globe. Dickson's reward was the C.B.E.

On resigning his chair he was engaged for a short time on the staff of *The Blue Guides*, but soon became principal assistant editor of the forthcoming additional volumes of the *Encyclopædia Britannica*; and recently, on the completion of this work, he was engaged on the staff of a large publishing house.

Approaching geography gradually, with a fine record of original work in physical science, Dickson's main contribution to the modern teaching of the subject, of which he was one of the pioneers, was his insistence on a sound physical foundation for the science of distribution. Accuracy of ascertained detail distinguishes his work from that of many who follow the American school. He was equally insistent on a sound concatenation

of style and effect. His text books are models of freshness, interest, and accuracy. Nor was his outlook narrowly restricted to matters physical; on the contrary, breadth of view was one of his distinguishing characters.

In earlier days Dickson was a traveller, a horseman, and a musician. Later his work absorbed all his energies, but it did not curtail his interests. An excellent story teller, with a great fund of anecdote, and of humour, which was delightfully Scottish without being caustic, he was a most charming companion. As a teacher he was inspiring, as a colleague, helpful and dependable to the last degree; and his help was ever freely given, whether in affairs scientific or material. A. S.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

MEETING OF COUNCIL HELD ON 9TH MAY.

The Late Mr. James Cornwall.

The Chairman of Council at the above meeting said that he wished to express his great regret at the recent death of Mr. James Cornwall, which had occurred since they last met. In addition to his long public service abroad, Mr. Cornwall had during the years he resided in Edinburgh devoted the remainder of his life to many useful works, including the interests of the Royal Scottish Geographical Society. He was a member of Council and one of the Society's trustees. The Council would greatly miss his valued help and his regular presence at the meetings. The Secretary was instructed to send a copy of this minute to his family with an expression of the Council's sympathy in their bereavement.

Resignation of Mr. R. W. K. Bain, Advocate, Hon. Secretary Aberdeen Centre.

A letter from Mr. Bain, the former Secretary to the Aberdeen Branch of the Society, intimating the fact that he had now resigned office and handed over his duties to Mr. Hay, Advocate, Aberdeen, having been read, the Secretary was instructed to write to Mr. Bain expressing the high appreciation by the Council of the great services which he had rendered to the Society during his long period of office, which extended over thirty-four years.

University Students of Geography.

The Council expressed their approval of the suggestion that University Students of Geography should be admitted as Associate Members, and directed that steps should at once be taken to have such an alteration made in the laws of the Society as would allow of this being done.

GEOGRAPHICAL NOTES.

EUROPE.

Malaria and Mosquitoes in Denmark.—Dr. C. Wesenberg-Lund has recently completed a memoir on the gnats and mosquitoes of Denmark (see abstract in *Nature* for 9th March), which contains some observations and deductions of geographical interest. The spotted-winged Anopheles, the species which forms the chief carrier of malaria in Europe, occurs in that country, where it is near its northern limit. But malaria has disappeared from Denmark, the last great outbreak having occurred in 1831, and it is pointed out that the mosquito now rarely attacks man, and is infrequently seen in the open. But it has not died out, for Dr. Wesenberg-Lund finds it in enormous numbers in pigsties, cowsheds, and stables. There it feeds upon the blood of domestic animals, and appears to spend the greater part of its life within the shelter of the farm buildings. There has thus been a complete change of habit, itself associated with the change in Danish agricultural methods which took place about a hundred years ago. Prior to that time the pigs fed largely in the woods, and the stall-feeding of farm animals was not carried on. With the growth of stall-feeding, it would appear that the mosquitoes were attracted to the buildings by the odour and warmth due to the presence of the animals, and lost the habit of attacking man. Thus malaria died out, in the absence of an agent transmitting the germs from sick to healthy persons. In the Mediterranean region, on the other hand, where the temperature is higher, the mosquito habitually flies about in the open, and feeds chiefly on human blood. Once infected, therefore, it necessarily acts as a disseminator of malaria.

Mineral Resources of the Serb-Croat-Slovene State.—In the year 1919 a British Economic Mission was sent to Serbia, with a view both to investigating the needs of the country, so far as reconstruction was concerned, and also the possibility of rendering assistance, through British commercial and industrial sources, in the development of the resources of the country. In connection with the work of this Mission, Mr. D. A. Wray, B.Sc., F.G.S., was sent to study the mineral deposits of Yugoslavia. His Report has been recently published by H.M. Stationery Office as a pamphlet (*The Geology and Mineral Resources of the Serb-Croat-Slovene State*), and a copy of this Report has been sent to us. It contains a large amount of information not hitherto available without much research, is copiously illustrated by maps, diagrams, and from photographs, and possesses a useful bibliography. It thus forms a valuable addition to the somewhat scanty existing literature dealing with the new state.

Although the contents are for the most part too detailed to permit

of a short summary, we may note a few of the more general points brought out. Statistics of mineral output, in the pre-war period, are, as in the case with so many statistics, only available for Serbia on the one hand and Bosnia-Herzegovina on the other. Those for the Slovene lands and for Dalmatia were incorporated with the general Austrian figures, and those for Croatia-Slavonia with those of Hungary. The figures available show the relative insignificance of the mining industry alike in Serbia and in Bosnia-Herzegovina. In 1912 the value of the Serbian output was about £763,000, and that of Bosnia-Herzegovina about £264,000. It would not appear, however, that these figures can be regarded as indicating that minerals are scantily developed in either area, for extensive remains of old workings are found, and modern mining in Serbia is of very recent growth. The difficulties of communication, which have been greatly accentuated since the War, and, in Serbia especially, the want of capital and of trained engineers, have hitherto been great obstacles in the way of development. Of the other Yugoslav territories the Slovene lands possess considerable mineral deposits, and both mining and industry had undergone considerable development before the War. It will be remembered, however, that a considerable part of the area inhabited by Slovenes is outside the frontiers of the new state.

Within the new state the development of mining is likely to be checked, as is pointed out by Mr. Wray, by the difficulties of communication with the sea and with neighbouring states. Despite the acquisition of a long stretch of coastline, Yugoslavia has meantime no adequate port at her disposal, and in the interior the lack of sufficient rolling-stock was, in 1919, a great obstacle to mining enterprises.

As regards the minerals represented, there are large supplies of coal, but true coal is rare, and the deposits mined are practically all brown coals of Mesozoic age or lignites of Tertiary age. These coals can be used for the railways and for ordinary industrial purposes, but for many factories and furnaces higher-grade coal is necessary. Before the War this was chiefly imported from Bohemia and Westphalia. Bosnia appears to have considerable stores of iron ores. There was a small iron industry here in Turkish times, and from 1890 onwards the Austro-Hungarian Government devoted a considerable amount of attention to the industry, especially during the war period, when prisoners were extensively employed. Other minerals include copper, especially in Serbia, and manganese, especially in Bosnia.

ASIA.

The South-West Monsoon of India.—In a lecture delivered to the Royal Meteorological Society last year, and published in the July issue of the *Quarterly Journal* of the Society, Dr. G. C. Simpson gives a very clear and full account of the causation of the rainfall conditions

associated with the south-westerly winds which blow from June to September in the Indian region.

He begins by pointing out that the usual summary statement that the monsoon is due to the higher summer temperature of the land, as compared with the sea, causing an indraft of sea-air towards the interior, is not in itself satisfactory. Thus it fails to take account of such facts as that India is hotter in May, before the monsoon sets in, than in July, when it is at its height ; that the hottest part of India, the north-west, gets no rain during the monsoon ; that the average temperature is higher in years of bad rains than of good rains, and so forth. The monsoon should not, therefore, be regarded as the simple result of a single physical condition. It is produced by a combination of circumstances, involving considerations of temperature, pressure, humidity, geographical relationships between land and sea, the rotation of the earth, and, probably most important, the distribution of the mountain ranges.

A detailed consideration of temperature and rainfall conditions during the monsoon season then leads him to the conclusion that the heavy rain which falls over the greater part of the country is due to the inflow of large quantities of damp, warm air into a region where, on account of the peculiar distribution of the mountain ranges, it is forced to ascend, and in consequence to deposit its moisture as rain. The actual temperature over the Indian land area is not directly responsible for the ascensional currents which cause the rain ; on the contrary, in the regions where rainfall is absent, the temperature is abnormally high, while the greatest rainfall is accompanied by low temperatures.

The next point is to consider the reason for the remarkable flow of moist air into the Indian area, and this demands an appreciation of wind and pressure distribution over a large part of the earth's surface around the Indian continent. A study of a world map indicating wind and pressure distributions during July will show the existence of (1) a region of low pressure over Asia ; (2) one of high pressure over the South Indian Ocean ; (3) a flow of air across the equator.

Taking these three sets of facts as his basis, Dr. Simpson states as follows the main causes of the Indian monsoon :—(1) The *primary* cause of the monsoon is the difference of temperature over land and sea. (2) The relatively high temperature over the land in the northern hemisphere during the summer tends to lower the pressure there. (3) As the pressure falls over the land air motion results. The air motion is acted on by the rotation of the earth, it also modifies the original temperature distribution, which again modifies the original pressure. The result of all these interactions is a closed low-pressure system over the whole of Asia and North Africa, with the lowest pressure in the north-west of India. The pressure distribution in this final system bears no close relationship to the actual temperature in the different parts. (4) The air over the north of the Indian Ocean takes

part in the general motion set up by this huge pressure system. As the ocean is situated in the southern quadrant of the system, the air motion over it is from the south-west. (5) As the pressure falls over the land in the northern hemisphere it rises over the ocean in the southern one. The resulting air motion, affected by the earth's rotation and the distribution of land in the southern hemisphere, modifies the pressure distribution, the final result being a closed high pressure system in the south of the Indian Ocean. (6) The air here moves, under the influence of this pressure distribution and of the earth's rotation, towards the north-west, as far as the equator. (7) There it is caught in the circulation round the northern low-pressure system, and moves towards the north-east; thus the two air motions are continuous across the equator. (8) In consequence, the air which reaches India has travelled for 4000 miles over the ocean, and is highly charged with water vapour. (9) The current over the north of the Indian Ocean, coming from the south-west, is impelled forwards by forces extending over the whole region of its motion, and is directed towards the high mountains of India, which are so arranged as to form a barrier to the north and east. (10) The air is in consequence caught in a kind of trap, from which it can only escape by rising, and this rise brings heavy rain. (11) The actual distribution of the rain is determined by the mountain ranges. Thus the dry area to the north-west is due to the mountains preventing a large inflow of moist air, combined with a dry upper wind and the high temperature, both of which help to prevent precipitation.

This account does not answer the question why the monsoon does not set in in May instead of June. But observations at coastal stations show that during that month less air is flowing into India than in July, and that the incoming air is appreciably drier. Pressure maps for May show that both the Asiatic low-pressure system and the southern high-pressure system are not then fully developed. In consequence the air motions caused by the two systems are not joined up over the equator. The moisture which, later in the year, is deposited over India is during May lost near the equator, owing to ascensional motion taking place there.

The paper, of which this is a brief summary, contains a number of other interesting facts, and is worthy of careful study.

America.

The Island of Cuba.—In the April issue of the *Geographical Review* there are two striking articles on Cuba. The one, by Professor R. H. Whitbeck, is entitled "Geographical Relations in the Development of Cuban Agriculture," while the other, which is of a somewhat unusual type, is called "Geographic Factors in the Relations of the United States and Cuba," and is by Dr. Whittlesey.

As to agriculture, the striking feature is the predominance of sugar

as the main crop of the island and the great developments which have taken place since the bond with Spain was severed. As regards the first point, it may be sufficient to say that in the year 1920—when the price of sugar was high—the value of Cuba's exports was nearly three times greater than those of Spain, and 91 per cent. of the total was made up by sugar. In the year 1920-1921 nearly four million tons of sugar were exported, or nearly one-quarter of the world's total sugar supply. The rapid increase in production in recent years is indicated by the fact that in 1895, just before Spanish rule ended, production reached for the first time one million tons.

The increase is due to closer relation with the United States. The political bearings of this fact are considered by the second author, while Professor Whitbeck confines himself to summarising the conditions which made the interference of the United States inevitable, because profitable. The first point is the fertility of the soil, which is derived from the wearing down of limestones, and is capable of being cropped continuously, with little or no manuring. Further, except in the east, where the highest mountains occur, there are large expanses of level land, rendering the use of farm machinery possible. Harbours are not only numerous and good, but occur on both coasts, so that export is easy. The climate, with a long wet season in the hotter part of the year, and a drier period at harvesting time, is eminently fitted for the sugar cane ; while, owing to the shape of the island, and the extent of surrounding water, it is not ill-suited for white settlement ; for the nights are cool, and the trade winds diminish the oppressive heat. Finally, though the author does not lay, we think, sufficient stress upon this fact, the nature of the population, with the strong negro element, encourages the plantation system as against mixed farming. Nominally 75 per cent. of the Cubans are "white," but many of these have apparently some negro blood. In any case, they show little aptitude for ordinary agriculture or even gardening, and it is noted that, despite the climate, Cuba imports as much fruit as she exports. Given all these conditions, and given also the very large demand for sugar in the United States, and the ability of that country to supply the capital and machinery which make large-scale sugar production possible, given also that the position of the island facilitates the seasonal immigration of the necessary unskilled labourers, what has been somewhat ponderously called the "politico-geographical law of gravity" was bound to come into action. This is the subject of Dr. Whittlesey's article. He points out that nearly one hundred years ago President John Quincy Adams asserted that Cuba would necessarily, in course of time, "gravitate . . . towards the North American Union," and proceeds to consider why the prophecy took so long to attain fulfilment. It is shown clearly enough that Cuba has always possessed for the United States a double interest, that due to its geographical position, which gives it strategical importance, and that due to its potential resources. So long as American capital and enterprise were not extensively involved, the policy of the State was limited to

making it clear that, in the event of Cuba passing out of the control of Spain, no other European power would be tolerated there. The causes of the Spanish-American War are regarded, quite simply, as fundamentally economic, for the amount of American capital invested in the island had increased greatly. The details of the argument cannot be given here, but the article is worthy of note, for it has somewhat wide implications, which are not, however, considered by the author in any detail.

General.

Dr. Bruce's Explorations. The late Dr. W. S. Bruce left a great deal of unpublished material relating to his travels and explorations in polar regions, and his researches in the history of early voyages to the Weddell Sea. A volume on his explorations is in preparation, and Dr. Rudmose Brown (The University, Sheffield) would be grateful for the loan of any important letters or other papers bearing on Dr. Bruce's activities, especially his earlier expeditions.

Economic Geography.

The Post-War Textile Industry of Bas-Dauphiné.—A note—all too brief—in the *Annales de Géographie* for November 15 last brings out a curious industrial change which has resulted in the region named from war conditions. For about half a century the silk industry of Lower Dauphiny had been undergoing a process of evolution quite analogous to that which has occurred elsewhere. In other words, an original small domestic industry had been steadily replaced by factories, utilising, in this case, the water-power of the region instead of coal. Since the population is naturally sparse and scattered, the rise of factories meant the establishment of hostels to house the women workers near their employment. When the War broke out these workers returned to their homes, and, although in 1919-20 there was a period of great activity in the silk trade, the hostels have remained deserted. For, by a curious reversal of recent trends, the industry is in process of again becoming a domestic one, and the factories are decreasing in importance. It has, however, become domestic with a difference. In the first place, the elaboration of the mechanical looms makes it necessary that the weavers should have skilled mechanics within reach. Thus though the looms have been transported from the factories to the country districts, they are not set up singly, but in groups of two or three together. The motive power is as easily supplied, by means of electricity, in the country as in the factory. A difficulty has, however, arisen in connection with the continuity of the current. Before the domestic worker can weave with profit to herself and her employer, she must be able to use her loom at any period of the day or night when she may happen to be at leisure from her other duties. But, both in the early morning and during the

hours of the night, the power is tapped by certain large factories, such as paper works, and the factories of the St. Etienne region, which absorb all the nocturnal surplus. This want of power at certain times is a great handicap to the scattered looms of the country districts, and means that more water-power is necessary.

Brief as the note is, it is of much general interest, for it has often been pointed out that the general use of water-power might conceivably lead to a reversal of the process which induced the growth of large industrial towns, and it is curious to find this occurring in south-eastern France.

NEW BOOKS.

EUROPE.

L'Albanie et les Albanais. Par Jacques Bourcart. Paris: Bossard, 1921. *Prix* 12 *francs.*

In June 1916 a small French detachment occupied Koritsa, with the object of cutting off communications between the German forces and the Greece of Constantine. The first occupation was followed, at the end of the same year, by the setting up in the town of an autonomous administration, under French control. This control, as the result of the fortune of war, was later spread over a considerable part of eastern Albania, and it lasted, with minor modifications, till the year 1920. M. Jacques Bourcart was attached to the administration in the capacity of geographical expert, and travelled throughout the whole of the country carrying on detailed observations. His little book, which has a map and nineteen illustrations from photographs, gives a general account of his observations and conclusions, and is to be followed by two other volumes.

The book is divided into three sections, of which the first gives an account of the physiography of Albanian territory and some general description of the inhabitants. The second is a historical sketch, brought down to the period of the French administration of the eastern area, while the final section discusses the life of the Albanian people to-day and the probable future of the country. For the Albanians the author has a very great admiration, their chivalry and hospitality being especially praised, and he looks forward to a bright future for them. His accounts of the country and people are detailed and precise, and the book is a very welcome contribution to the existing—somewhat scanty—literature on the subject.

The Physical Geology of the Don Basin. By Alex. Bremner, M.A., D.Sc. Aberdeen University Press, 1921.

Dr. Bremner has done good service by his work on the development of the River Systems of the Don and other rivers, in this pamphlet as well as in the original articles he has written in the pages of the *Scottish Geographical Magazine* from time to time. It is only within comparatively recent years that geographers and geologists have turned their attention to this very attractive subject, and in Dr. Bremner's researches we have the results of much careful field observation in Aberdeenshire, which it is to be hoped he will be able to extend to other districts. He traces out the changes through which the Don Valley has passed since the

river originally flowed eastwards down a gently inclined peneplain, a denuded old land surface with a fall in the direction of what is now the North Sea. In the course of time some parts of the valley system have obviously changed—the heads of some tributaries have been decapitated by others so that the upper waters were diverted into new outlets, leaving dry bits of valley or "windgaps" to mark their former course. The effects of subsequent glaciation are also explored, and the sites of several temporary overflow channels of glacial lakes in the glens are shown on the illustrations that are plentifully provided in the pages of this interesting work.

There are in the Highlands many other problems of this kind awaiting investigation. Among these may be mentioned the remarkable mouth of Glen Lyon and the deep windgap on Loch Tay at Fearnan at the west end of Drummond Hill. How is this deep gash to be explained? And how do we find a great deposit of alluvium with a series of splendid river terraces at Taymouth where only clear water now flows out of Loch Tay? Alluvial plains are to be looked for at the head of lochs where turbid streams flow in and deposit their fans of sediment, but not at the outlets. It is clear there has been some great change in the physical conditions here since the rivers began to flow, and an exposition of this little corner by a skilled observer like Dr. Bremner would be of much interest. We would commend this spot to his attention in his next paper. H. M. C.

Études de Cartographie Historique sur l'Alemanie. Par J. M. Tourneur-Aumont. Paris: Librairie Armand Colin, 1918. Pp. 322.

This is an examination of the sources for the study of the homeland of the Alamani, the headwater regions of the Rhine and the Danube, the *Agri Decumati*. Naturally, however great the interest, the problem is very special. The book contains a discussion of *cartographie historique de précision et de reconnaissance*, the terminology being borrowed, of course, from general cartography. The distinction seemed laboured to us, and the terms not quite happy.

ASIA.

Among Primitive Peoples in Borneo. By Ivor H. N. Evans, B.A., F.R.A.I. London: Seeley, Service and Co., Ltd., 1922. *Price* 21*s. net.*

British North Borneo, the portion of Borneo which is under Chartered Company rule, forms but a small part of the huge island, after Australia and Papua the largest in the world, and it is with this portion that Mr. Evans's book deals. He is, or was before the War (for his book was written in 1915, although it is but newly published), a district officer in the service of the British North Borneo Company, and it is with the Tuaran and Tempassuk districts, *i.e.* the districts which are watered by the two rivers bearing those names, that he deals. Apart from Sarawak and Brunei, both in the North-West, the former ruled by its Sultan and the latter under British protection, though practically independent, the whole West and South East of the great island are under Dutch rule. The territory of the British North Borneo Company forms but a slice of the North and North-East, having an area of 30,700 sq. miles, or about one-eighth of the island, and a population of about 200,000. So much of the country in the interior is under virgin forest, or jungle, that the population there is necessarily scanty, but the coast-line is fairly well peopled. The dwellers on the coast and on the lower reaches of the Tuaran and Tempassuk rivers are, we are told, Mahommedan Malays, while the natives of the interior are Indonesian pagans. Mr. Evans appears to be a keen anthropologist, as well as a traveller and explorer, and he has

made a study of the native peoples and their customs, the result of which he has embodied in a book of singular interest treating of a part of the world about which very little is known. He does not appear to entertain a high opinion of the coast people, the Bajaus and Illanuns, whom he characterises as being lazy, boastful, and untruthful, though many of them have their redeeming qualities, being "good sportsmen." They have been freebooters and rovers for many generations, and the Illanun pirates made their name known and dreaded throughout the Malay Archipelago. The history of the British Navy in the forties and fifties of last century shows what was done to put an end to piracy in Malayan waters, and now that these North Bornean Malays are under the rule of the Chartered Company they can no longer carry on their old nefarious business. The natives of the up-country regions, *i.e.* the Indonesian "Orang-Dusun," the people of the orchards, Mr. Evans considers to be much superior to the people of the coast, in spite of the head-hunting propensities of the former. He says, "The up-country man is hard-working, thrifty, and usually honest; he has, moreover, a manner which appeals singularly to most Englishmen, since he has no trace of the cringing and fawning style of many of the people of India, which, should there be any opportunity, quickly develops into very slightly veiled insolence. He meets the white man with a kind of man-to-man manner, which at the same time is perfectly respectful. The best type of native both respects himself and respects you; and, if you are of a friendly disposition, the respect will rapidly develop into liking on both sides."

Although Mr. Evans has been in the service of the British North Borneo Company he does not approve wholly of Chartered Company rule. While making no charge against the administration, much less against the Company's servants in the East, whom he believes to be extremely conscientious, he considers it to be a mistake to allow any body of men who have monetary interests to have absolute control over a large territory, for there must always be a temptation to look to dividend-paying, even if it be in some cases at the expense of the native peoples entrusted to the care of the Company and its officials.

There are many Chinese settlers about the coast of North Borneo, and there is evidence that the Chinese have been there from very ancient times. They are chiefly shopkeepers and small traders, but, as regards labour for planting, Borneo has rather a bad name amongst the Chinese, while the Indian Government will not allow its subjects to be recruited.

It is impossible here to follow Mr. Evans in his interesting and valuable notes on the customs, folk-lore, etc., of the people amongst whom his lot was cast, and of whom he appears to have made a very thorough study, and we can only make mention of his diary of a journey to Mount Kinabalu, the magnificent *massif* of the far north of Borneo which is thought to be the culminating peak of the whole Indian Archipelago. The map which accompanies the book appears to be rather sketchy, and it would have been improved had it contained more names for reference, but the book itself as a whole is well got up and well illustrated and forms a valuable contribution to a subject of very considerable interest.

The Sema Nagas. By J. H. Hutton, C.I.E., M.A., Indian Civil Service. With Maps and Illustrations, and a Foreword by Henry Balfour, M.A., F.S.A., F.R.G.S., F.R.A.I. Published by direction of the Assam Government. London: Macmillan and Co., Ltd., 1921. *Price* 40*s. net.*

A high type of Indian civil servant in an out-of-the-way district will often be found identifying himself with his people. To that class the author of this monograph belongs, and he has made his debtors not only the Empire and the people he sympathetically ruled but also the science of anthropology. The monograph on

the Sema Nagas is the outcome of eight years' first-hand knowledge of the people. It follows a similar volume by the same author upon another tribe of Nagas, the Angami Nagas. The service rendered to anthropology consists not merely in the careful recording and grouping of the customs and ideas of this remote tribe, but in the recording of customs and ideas which are already dissolving and being superseded. For, remote as the Naga Hills lie from any one of the world's highways, we learn that a body of Sema Nagas, one thousand strong, did their bit in France in 1917 as part of a Naga Labour Corps, that in respect of religion they are fast passing out of the Animist into the Polytheist stage, and that under British restraint they are no longer head-hunters like their untutored fellow Nagas beyond the Assam border.

The range of the Assam Hills, parallel to the Himalayas, the southern highlands of the Assam Valley, are divided from west to east into the Garo, the Khasi, the Jaintia, and the Naga Hills. The ordinary reader may thus grasp the locality of the Sema Nagas as the north-eastern portion of the Assam range, bounded on the south by the State of Manipur and on the south-east and east by Upper Burmah.

The chief chapters of the volume deal respectively with the domestic life, the social life, the religion and ceremonies, the language, and the folklore of the Sema Nagas, and numerous illustrations greatly enhance the value and interest of the work. The chapter on language gives an exhaustive list of Sema Naga words. The chapter on religion and ceremonies, perhaps the most interesting, shows that the Sema Nagas have already attained to a four-fold idea of deities. They have already reached the conception, although yet vague, of a supreme sky-deity, associated with origins, benevolent, but virtually unrelated to human affairs. Then there is a second class of deities, subordinate sky-deities, more material and active than the "Supreme Being," but still very largely separated in the popular belief from the details of human life. Thirdly, there is the class of jungle spirits, characteristic of Animistic religions, most in touch with man, often deliberately maleficent and requiring much propitiation. That the Sema Nagas are, however, beyond the most primitive Animism is shown by the already acquired definiteness of these spirits—they have already their several names and spheres of influence. Fourthly, there are for the Sema Nagas attendant spirits attached to individuals and houses. This fourth class, the author says, suggests, at one time, the idea of an animating soul, at another time of a familiar spirit; and the spirit may function either as a guardian or a malignant looker-on.

As might be expected in a religion at this stage of development, the soul, we learn, is not regarded as a permanent life-tenant of its own special body: it may upon occasions leave its regular dwelling to take up its abode elsewhere. Curious evidence, which the author apparently accepts, is given of the temporary residence of human spirits in the bodies of leopards, evidence at least of the sympathy of the human bodies, temporarily abandoned, with the actual experiences of the wereleopards elsewhere, into which the human spirits have temporarily entered. "When such a wereleopard is being hunted the human body behaves like a lunatic, leaping and throwing itself about in its efforts to escape." Psychical research societies may take note.

Mysterious Japan. By JULIAN STREET. London: William Heinemann, 1922. *Price* 12*s.* 6*d. net.*

It has been the lot of the present writer to read many books on Japan, and to review some of them, and the subject, interesting though it be in itself, tends to pall at times. But Mr. Street has a way of putting things which exorcises the

demon of boredom, and he succeeds in clothing the familiar scenes in fresh and attractive garb, and also in giving his readers some insight into the mind of modern Japan.

Mr. Street uses the word "Mysterious" as a qualifying adjective in the title of his book, but his argument is, on the whole, rather against mystery, and he contends that, for those who approach the Japanese in the right way, taking the pains to comprehend their point of view and the social traditions and customs which influence the people, the element of mystery tends to disappear, and they turn out to be very human and not unlike other folk nearer home. Allowance has to be made for their environment, and, as to this, Mr. Street remarks rather quaintly that "the satisfying thing about Japan is that it always looks exactly like Japan" from the moment that the pilgrim from Europe or America sets his foot upon the pier at Yokohama—"it could not possibly be any other place." This in itself is a rather satisfying condition when one compares it with the drab sameness of so many havens which are visited by the traveller in the Western hemisphere.

Mr. Street considers that the Japanese people possess in a remarkable degree the artist's sense of form, and that their national love of the beautiful is exhibited best in their feeling for outdoor beauty. He quotes a native art-collector friend who instanced the delight of the Japanese in the time of blossom—the cherry, the wistaria, the chrysanthemum, and in gardens—and he draws an interesting comparison between Japan and Italy, in both of which artistic feeling is highly developed. He points out that, in spite of their antipodal positions, the two countries have many common problems to face, and have one common blessing. "Both Japan and Italy are poor and overpopulated, both are handicapped by a shortage of arable land and natural resources, both lack an adequate supply of food and raw materials for manufacturing, both are mountainous, both are afflicted by earthquakes; but both are endowed with the peculiar passionate beauty of landscape which is nature's compensation to volcanic countries."

Mr. Street had the advantage of being furnished with introductions to some of the leading men in the political world of Japan, and one of his best chapters is devoted to an account of some of the Grand Old Men, the Genro, or Elder Statesmen, such as Field-Marshal Prince Yamagata, Marquis Matsukata, and Marquis Okuma, all three of them octogenarians who had lived through the marvellous changes in their native country and who were still powerful figures in politics at the time of Mr. Street's visit. In speaking of the relations which exist between the United States and Japan, Mr. Street, who is himself an American, makes some very pungent remarks on the Californian methods of treating questions of Oriental immigration; remarks which are worthy of attention in their bearing on the relations now existing between Japan and America. But there is a great deal in Mr. Street's book which lies outside of the sphere of politics and art; he had opportunities which do not come in the way of the ordinary traveller of seeing something of the inside of Japanese life, and his gift of humour serves to add savour to a very interesting volume. J. D. M.

AFRICA.

Wüsten, Palmen, und Basare. By Ewald Banse. Braunschweig: Westermann, 1921.

In the early spring of 1914 the author of this book, who had, he tells us, felt the lure of the desert from his early childhood, started from Germany for Egypt in order to undertake an expedition to the Libyan desert. He landed at Alexandria, and with some difficulty succeeded in getting a caravan together. His

station was to utilise the Morocat railway so far, then strike off by a new route through the deserts to the Siwa oasis, which was to be the real starting-point of his expedition. He had not, however, quitted the railway when he was informed by telegraph that the authorities were unwilling to permit him to make his journey. The disappointment was naturally great, and Mr. Lanse seems to have taken it badly, ascribing the prohibition to British *Weltpolitik*, and calling himself "the first victim of the World War."

He made a short journey over the Libyan plateau and then returned to Alexandria. There he took an Italian coasting-ship, which carried him to the town of Tripoli. From Tripoli he made his way through Tunisia and Algeria to Morocco, thus completing the journey from the Nile to the Atlantic.

His book is full of mannerisms, some of which seem to exclude the notion that he has even a grain of humour in his composition. Nor is it devoid of padding, as witness the detailed discussion of the relative merits of the steamboats belonging to the different nationalities having services on the Mediterranean. The discussion in this case centres largely over the bills of fare on the different boats, and Mr. Lanse has specific recommendations to make on this interesting topic. But, with all reservations made, such a journey, carried out by a trained observer, cannot fail to yield much of interest, and the book can be recommended to those desirous of increasing their knowledge of Near Eastern problems.

Barbary. The Romance of the Nearest East. By A. Maccallum Scott, M.P. London: T. Butterworth, 1922. *Price* 12*s.* 6*d. net.*

In this interesting and lively volume Mr. Maccallum Scott describes his visit to "the Barbary States, or the Maghreb, that portion of North Africa which lies between the Syrtes and the Atlantic, the Sahara, and the Mediterranean. It is a high plateau supported by the Atlas Mountains and with fertile valleys and plains along the Mediterranean shore." By "the Syrtes" the author means the Gulf of Gabes, the ancient Syrtis Minor, the eastern extremity of Tunisia. The author began his tour with Algiers, which he picturesquely describes as follows: "Algiers is almost wholly Oriental. The town is like a veiled woman from the harem wearing a pair of high-heeled Parisian shoes. The quarter round the harbour is French, with spacious boulevards, gay Parisian shops, open-air cafés, and electric cars. But the old town, which climbs up the steep hill-side, terrace by terrace, to the kasbah or fortress, is as Oriental as Baghdad." Sometimes a tropic rain bursts upon the scene, "but mostly Algiers basks in sunshine, stretched out upon the steep hill-side, garlanded with groves of oranges, lemon, palm, olive, cypress, and pine, festooned with roses, geraniums, clematis, mimosa, and bougainvillaea, and dipping her unsandalled feet in the clear waters of her sheltered bay." There is also a "plenitude of clear radiant light, a new experience to Northern eyes." The author found it "delightful to sit and bask in the sun, to soak in the warmth and light, amid a hundred shades of green; for, in spite of the beating sun, there is a cool caress in the air, a tinkle of ice in the wine-glass, just a faint suggestion of the snows of Atlas far to the south. The shadows can almost be felt like a cool leaf on the cheek. It is a tonic air."

Of course the author went to Biskra, the desert town of Algeria, visited, he says, by hundreds of tourists every year owing to the popular success of Mr. Robert Hichens's novel, *The Garden of Allah*, now as much the tourists' handbook to Biskra as *The Lady of the Lake* is to the Trossachs. The author met at Biskra an Englishman, and asked him if he knew Arabic. "No, he could not say that he knew Arabic. He had only been working at it for some sixteen years. He spent two or three months every year like this, wandering among the Arabs

and improving his knowledge. Why? Oh, it interested him—it was his hobby. He would rather do this than play golf. The structure of the language was simple—very like English indeed—but there was need for a tremendous amount of sheer memory work."

By motor car from Batna the author proceeded to Lambessa and Timgad with their wonderful Roman remains. "Nowhere else in Europe, Asia, or Africa does there exist a Roman camp so perfectly preserved, so fully documented with inscriptions, as the headquarters of the Third Augustan Legion at Lambessa. Over 2500 inscriptions have already been deciphered. The lay-out of the camp, the principles of fortification, the system of military administration, and even the domestic life of the soldiers are all revealed." A map of this part of Roman Africa and a view of the Arch of Trajan and Timgad are given.

After discussing at Hammam Meskoutine with a Dolmen hunter the Dolmens found here as in Scandinavia, Britain, Brittany, and Spain, the author proceeded to Tunisia, and describes the town of Tunis. Then he visited the site of Carthage, and remarked in the Museum there most interesting remains "relating to the Phoenician worship of Baal and his consort Tanit, or Ashtaroth as she is known to us in the Bible." Referring to Gustave Flaubert's celebrated novel *Salammbô*, a realistic romance of ancient Carthage, he says, "In *Salammbô* it is Carthage indeed that we see, but we look through a distorting lens."

The author ascended Bou Kornein, the Mountain of Baal, which dominates the Gulf of Tunis, and is 1875 feet in height. A magnificent view was obtained from its summit. "Bou Kornein is a cone of igneous rock sharply jutting through the limestone beds which have been thrust up to form the bastions at its base. The central cone is shot through with crystalline veins of quartz. Obviously it is a volcano in the line of the same fissure in the earth's crust which produced Etna, Stromboli, and Vesuvius." There are hot springs at its base and along the coast.

"Tunisia is an ideal country for motoring. It has a wide variety of picturesque scenery. And the roads by which it is traversed are perfect." The author adds, "I have never seen anything like these French roads." He motored through the area which was called by the Romans Byzacium, and was one of the chief sources from which Rome drew her supplies of corn and oil. There are sixteen illustrations from photographs and two sketch-maps in this attractive and well-written book.

The Soul of Central Africa: A General Account of the Mackie Ethnological Expedition. By the Rev. John Roscoe, M.A. Pp. 327, Index and Map. London: Cassell and Co., Ltd., 1922. *Price* 25*s. net.*

Mr. Roscoe has written an account of his wanderings in Uganda through the native kingdoms of Ankole, Toro, and Bunyoro, and the Eastern Province, on behalf of the Mackie Ethnological Expedition. Throughout the area travelled law and order prevail, and life and property are safe. The route followed covers well-known tracks, and, from a geographical point of view, there is nothing of interest to record. It was a pleasant and easy tour, facilitated by the various District Commissioners, under orders to assist an ex-missionary travelling on ethnological research under the aegis of the Royal Society.

The research began at Mbarara, the capital of Ankole, where the Mugabe (king) arranged for various old men to be interviewed, but, apart from cattle and milk customs, produced little of interest except a supposed discovery of polyandry amongst the Bahima of Ankole, which it would be as well to accept with reservation until more evidence is forthcoming than Mr. Roscoe's bare statement.

From Ankole he wandered a while in Kigegi, the extreme south-west district of the Protectorate, and thence passed on to Toro, where his reception from the Mukama (king) appears to have been somewhat cool, so he went on to the south end of Lake Albert and continued his adventures by steamer and motor to Masindi, the capital of Bunyoro. There he had a scoop, for the Mukama (king) not only provided story-tellers *ad lib.*, but arranged and carried out a week's pageant at Hoima, the former capital of Bunyoro, in which old-time customs were staged for Mr. Roscoe's benefit, the Mukama himself taking part. How the king, Andereya Duhaga, an intelligent, well-educated native and a capable ruler, was induced to participate in what was to all intents and purposes a camera stunt, is not explained.

From Bunyoro Mr. Roscoe wandered about the Eastern Province, and, as the account of his travels there is not forced like the preceding 223 pages, this section forms the most interesting part of the volume.

Taken as the journal of a tourist in Central Africa, *The Soul of Central Africa* is of interest; but as a serious work on the ethnology of the races inhabiting the kingdoms traversed, it is not to be compared with the author's previous books—*The Baganda* and *The Northern Bantu*.

Throughout the book there is a pedantic and purposeless mis-rendering of place and tribal names (Luwenzori for Ruwenzori, Bahuma for Bahima, etc. etc.) which does not add to its value. H. R. W.

Up against it in Nigeria. By Langa Langa. London: George Allen and Unwin, Ltd., 1922. *Price* 18*s. net.*

Of geography in the strict sense this book may be said to contain little. It consists of a series of sketches, humorous and somewhat cynical, of the adventures and experiences of a Political Officer in Nigeria, based on thirteen years' work in the country. The period discussed includes the years of war, and among the author's adventures was that of being torpedoed and flung into the water when on board the ill-fated *Falaba* in March 1915. But if the immediate interest is human rather than scientific, the book nevertheless gives an extremely vivid description of life in a tropical dependency, and of the qualities in the ruling race which make successful administration possible. It is good reading also. There are a large number of striking illustrations.

The Canary Islands: Their History, Natural History, and Scenery. By David A. Bannerman. With 84 Illustrations and Maps. London: Gurney and Jackson, 1922. *Price* 30*s.*

Mr. Bannerman's book on the Canary Islands is a handsome volume well printed on good paper. It is illustrated by numerous plates and four maps. The plates are chiefly photographic views of the scenery and physical features of the islands. There are three coloured plates of birds—showing the remarkable blue chaffinch of Gran Canaria, Canarian titmice closely resembling our blue tits, and Canarian chaffinches.

The author has made a very thorough exploration of the islands, which he visited on no less than ten occasions, both privately and on behalf of the Bird Department of the British Museum. The first part of the book gives some account of the discovery and early history of the islands, discusses the origin of the archipelago, and describes in some detail the physical features and the regional distribution of the fauna and flora. The second and third parts contain accounts of various expeditions made by the author during a more or less thorough

exploration of the islands in pursuit of birds. The ornithological results of these expeditions have already appeared in the pages of the *Ibis*.

In his interesting chapter on the origin of the Canary Archipelago Mr. Bannerman upholds the theory that the islands are not the peaks either of the mythical Atlantis of Plato or of a former continent which has sunk beneath the waves since the Tertiary days, but that they were formed by volcanic action some time in the late Tertiary period, probably in the Upper Miocene.

He had the good (and bad) fortune to experience the terrible sandstorm to which Gran Canaria was subjected from 8th to 11th February 1920. Samples of this dust were collected and thoroughly examined, with the result that the dust was shown to be of desert origin, the probable source of the material being the deserts of Africa. On the other hand, the remarkable sand-dunes which cover a large area in the neighbourhood of Las Palmas in Gran Canaria are shown to be of local origin.

In his study of birds the author naturally paid much attention to the zones of vegetation in relation to the distribution of bird-life. The Eastern Islands are low-lying, and composed for the most part of deserts and extinct volcanoes. Their vegetation is of special interest to the student of desert flora, many of the shrubs and plants being peculiar to the islands on which they grow. The Western Islands are all mountainous, their summits varying from 4400 feet in Gomera to 12,180 feet in the snow-clad peak of Tenerife. Accordingly one finds different belts of vegetation characteristic of the climatic conditions met with at various levels. Mr. Bannerman enumerates the following zones in Gran Canaria :— 1. Maritime or African Zone—sea-level to 1000 feet ; 2. Monte Verde or District of Cultivation—1000 to 3000 feet ; 3. Pinar (pine forest)—3000 to 4000 feet ; 4. "Cumbres"—mountainous, unforested area, 4000 to 6400 feet. In Tenerife is a still higher zone, "Above the Clouds," 6500 feet to 12,180 feet. Above 10,000 feet a viola, a moss, and a lichen occur. A sad account is given of the havoc being wrought among the magnificent pine forests of Gran Canaria by the charcoal burners, a havoc which, if not checked, will result in the utter destruction of the woods.

In the course of his wanderings the author naturally penetrated far beyond the usual beat of the tourist. Visits were paid not only to Gran Canaria and Tenerife but to Fuerteventura, Lanzarote, Graciosa, Montaña Clara, and Allegranza, Gomera, and Hierro. He was unable to visit Palma, as he had planned to do in 1920, owing to the island having been placed in quarantine through fear of influenza. Having been informed that some visitors who succeeded in landing were immediately thrown into the sea by the hospitable islanders, he naturally decided to change his plans. In justice to the Canarians it must be added that Mr. Bannerman generally found the natives of a friendly and even hospitable disposition.

The origin of the Canarian flora is a subject of much interest. Apparently the affinities of the endemic flora are with the plants of four regions—(1) the Mediterranean ; (2) the African ; (3) the Asiatic ; (4) the American. Although only fifty-seven miles of open sea separate the Canaries from the African coast, by far the greatest number of species peculiar to the Canary Islands belong to the first group, and have their affinities in North Africa and Southern Europe. A great deal of work has still to be done upon the problem of plant distribution in the archipelago, and the suggestion is made that some botanist who can spend a considerable amount of time upon the islands should do for the Canaries what Guppy has already done for the Azores.

While the book contains a great deal to interest the general reader, it will

appeal in a special degree to the ornithologist. We are told that "the Ornis of the Islands comprises in all 217 species and sub-species, of which 61 are resident and 156 migratory." Of the resident birds no less than 42 species and sub-species are confined to the archipelago and occur nowhere else in the world. This statement is an example "of the strides ornithology has made in recent years," for, when Wallace wrote his *Geographical Distribution of Animals*, we find "only five species recognised as peculiar to the islands." It is stated that a close study of the avifauna does not support the theory that the islands were connected with the African continent till a recent geological epoch. The birds of the Canaries are much more nearly allied to species inhabiting Southern Europe than to the African fauna. The few mammals have, with the exception of the bats, been introduced by man. Batrachians and reptiles are discussed in a single paragraph. Insects are merely mentioned. It may interest Mr. Bannerman to learn that, when the present writer was in Gumar about ten years ago, the hotel proprietor, an Englishman, told him that he had made a complete collection of the moths of Tenerife, and had sent it to the Natural History Museum at Oxford.

Probably most of his readers will wish that the book contained a little more about the human inhabitants of the islands. The play of the children, and the toys they make out of the prickly pear and other native products, would make an interesting chapter of itself. However, the book does not profess to be a complete account of the islands, or even of their natural history, and we must be grateful for a notable addition to the literature dealing with the Canary Archipelago.

W. B. DRUMMOND.

GENERAL.

Die Oberflächenformen des Festlandes: Ihre Untersuchung und Darstellung. Von Dr. ALFRED HETTNER. Leipzig: B. G. Teubner, 1921.

Dr. Hettner has already published, in the *Geographische Zeitschrift* from 1911 onwards, a series of articles on continental land-forms. His pamphlet is a greatly enlarged and thoroughly revised re-issue of these articles. The main position adopted is that while the methods and conceptions due to the American school of physical geographers have many merits in detail, the members of that school have yet gone astray in essentials both as to theory and as to practice. The work is thus not a text-book for the beginner, but sets forth the author's own investigations and the conclusions he has drawn from them. There is a short but useful index; there are, however, no diagrams of any kind.

The New World: Problems in Political Geography. By ISAIAH BOWMAN, Ph.D. New York: World Book Company, 1921.

According to the publishers' note prefixed to this book, it "is designed to provide for the average citizen the background of information that is necessary to understand the main international questions of our time and to follow their development." But as one might naturally expect from so distinguished a geographer as Dr. Bowman, the geographical aspects of the subject are emphasised, and the work is certain to prove of considerable value to every student of Political Geography. It is true that in attempting to discuss all the important problems of international politics which to-day perplex a distracted world the author essayed a herculean task, and it is not altogether a matter of surprise that his work should be somewhat uneven and at times somewhat disjointed. Occasionally, indeed, the reader has the impression that he is passing rather rapidly from one to another of the numerous handbooks published by various Governments for the use of their

representatives at the Peace Conference. In justice to Dr. Bowman, we must remember that not only was the task one of extraordinary difficulty, but that he was writing of a world in a state of flux, and that almost before the ink was dry upon his paper new problems had arisen ; we can hardly complain, for example, that in his chapter on Palestine he does not foresee all the troubles which have arisen between the Arab and the Jew.

One of the most conspicuous of Dr. Bowman's merits is the impartiality with which he treats the various aspects of his subject. But the desire to be impartial has the drawback that in some cases it has prevented him pushing his analysis as far as he might have done. Thus he says, "The Irish problem will never be settled until Irishmen are given a fair chance to manage their own affairs. And yet it is difficult to give that chance under such conditions of disorder as prevail at the present time." Such a statement may be true, but it is not likely to be of much assistance to British statesmen responsible for the conduct of Irish affairs, or to British voters desirous of doing what is right at the polls. On certain other matters also we could wish that Dr. Bowman had expressed himself more fully. We have, for example, an interesting account of the evolution of the new Baltic States and a discussion of the advantages which would follow their union. But how will a great and strong Russia—especially if she be organised on anti-Soviet lines—regard the existence of these States ? It seems almost impossible that she can so far forget her age-long struggle to reach the ocean as to permit a large part of her sea-board to pass from under her control.

In some cases Dr. Bowman appears to miss the essential point. In writing of the affairs of Egypt and the Sudan, he does not indicate the difficulties which must arise between an independent Egypt and the power which controls the Sudan with regard to the waters of the Nile. Such difficulties are not insuperable, but they are bound to exercise considerable influence upon Egyptian politics in the future, more especially if the Gebel Aulia and Sennar dams are to be completed. Again, in discussing the relations of Australia and Japan in the Pacific, the author dismisses the tropical north of Australia as "a strip on the north coast which falls within the limits of the equatorial rains during the southern summer." But this is the most critical area of the whole continent, inviting as it does Oriental immigration, and until the Australians have a definite policy with regard to it, it will remain a danger to them.

Dr. Bowman's survey, however, is not only honest, it is eminently sane, and there are many passages well worth consideration. The statesman and the soldier might both take to heart such a sentence as the following : "The world can never be at peace for long if every nation struggles for the best strategic frontier. No sooner is one strategic advantage gained than another is desired to protect it. The process is endless." While conscious of the fact that the present political condition of Europe makes special provision for minorities a necessity, he foresees the dangers to which it may lead. "Equality of treatment to the degree specified in the treaties places restrictions upon the action of a people in making laws or modifying their constitution that may prove unendurable. Such restrictions are really a limitation of material sovereignty respecting internal affairs. . . . Linguistic differences will be perpetuated and even increased. Irredentism will continue." In some cases Dr. Bowman almost seems to be prophetic. "In Germany to-day there is a strong tendency to pivot future political and economic influences in Eastern Europe, particularly in Russia, upon the German colonies, and if the policy is followed Germany will in future have an Eastern as opposed to a former Western orientation." Recent political events suggest that the change is already taking place.

some inaccuracies due to hasty writing might be removed in a later edition. The most productive coalfields of Jugo Slavia are in Slovenia and not "in Serbia and Bosnia" (p. 274). Nor is there any obvious reason why she should not mine 4,000,000 tons a year, her output in 1920 was within 10 per cent. of that amount. On page 280 we read that Rumania, "by the Treaty of Bucharest of 1913, acquired from Bulgaria the Dobrudja, on the south eastern border." The correct account is, it is true, given on a later page. On page 484 figures are given indicating the amount of traffic on the overland route from Kalgan to Siberia which must surely apply to days before the trans-Siberian railway was constructed. J. M'F.

Wanderings of a Naturalist. By SETON GORDON, F.Z.S. London: Cassell and Co., Ltd. *Price* 15*s. net.*

It goes without saying that Mr. Seton Gordon has put together a beautiful set of photographs, of which the majority and the best deal with bird life. We are most grateful for those pictures of wildfowl on the west coast of Scotland, and those of gannets from the Bass Rock such as "Good Hunting, My Child," facing p. 134. His text, however, is not of the order of his pictures. The interest of his details of bird life and work is undoubted; but he does not altogether carry us with him in his enthusiasms, especially for still nature. This is in great part due to his overstraining of phrases. The book is well worth buying for the pictures alone.

EDUCATIONAL.

The Provinces of Ireland: Ulster. Edited by GEORGE FLETCHER. *Munster.* Edited by GEORGE FLETCHER. Cambridge: University Press, 1921. *Price* 6*s.* 6*d. net each.*

These are the two first volumes of a new series dealing with Ireland, which is to be completed by others on Leinster and Connaught and a larger volume on the country as a whole. The books may be regarded as the equivalent of the *County Geographies* of Great Britain, the province being selected in place of the smaller unit. The method of treatment is broadly similar; it is to be noted, however, that the two volumes received are each due to the collaboration of a number of authors, not to individuals. This has doubtless certain advantages in that such topics as geology and botany are treated by experts in the special field concerned, but it deprives the books of unity and individuality. The editor states that political controversy has been "rigidly excluded," and "it is hoped that . . the books may be as acceptable in Belfast and Londonderry as in Dublin and Cork." The result is to give the impression that the different authors were conscious while writing of strong inhibitions. We note, for example, that in the treatment of the shipbuilding and linen industries of Ulster almost nothing is said as to favouring causes, the facts being presented and left unrelated. This seems to us to imply that in excluding "political controversy" the editor has also excluded the most interesting part of geography.

Map Projections. By A. R. HINKS. Second Edition. Revised and Enlarged. Cambridge: University Press, 1921. *Price* 12*s.* 6*d. net.*

This book, which is familiar to all students of the subject, was first published in 1912. In his new preface the author states that he has learnt much from his experience at the Royal Geographical Society, especially during the months of war. This has enabled him to add some new chapters to the book, which otherwise remains much as it was when first published.

The Nations of the Modern World. By Sir Halford Mackinder, M.A. Fifth Edition, completely revised. London: George Philip and Son, Ltd., 1921. *Price* 3*s.* 6*d.*

Sir Halford Mackinder states that he proposed at one time to remodel this book completely, in order that it might include a picture of the War and its effects. He found, however, that this was an impossible task, and intends to add a new volume to the series, carrying on the story from the year 1914. The present one, in consequence, considers the nations of the world, in their geographical setting, only down to the outbreak of the War.

The Teaching of Geography and Economics. London: Sir Isaac Pitman and Sons, Ltd., 1921. *Price* 2*s.* 6*d.*

In the spring of 1921 the publishers issued the first part of *The Encyclopædia and Dictionary of Education*, but in compliance with many requests from readers, and for other reasons, they decided to publish the greater part of the work in sectional form. Space forbids the enumeration of all the sections in the present volume, but mention may be made of the following: "General Geography" and "Practical Geography," by B. C. Wallis, B.Sc.; "Meteorology," by H. R. Mill, D.Sc.; "Astronomy," by A. R. Hinks, F.R.S.; and "Economic Geography," by J. MacFarlane, M.A. In all there are nineteen sections.

The Study of Geological Maps. By Gertrude L. Elles, D.Sc., Fellow of Newnham College, Cambridge. Cambridge: University Press. *Price* 12*s. net.*

This book forms a noteworthy addition to the scanty literature dealing directly with geological maps and their interpretation. There can be little doubt that Dr. Elles's book, which is based on notes of lectures and practical work given at Newnham, will be welcomed by geological students, particularly by those who have to study without the guidance of a teacher. The introductory chapter gives a concise account of the various ways in which surface relief is shown on topographical maps. Then follows a chapter — admirable in its suggestiveness — showing how the physical history of a region can be inferred from a careful study of such maps. A very full and useful discussion is devoted to the relationship between topography and the outcrops of stratified rocks. Methods are given for solving problems connected with dip. Folds, slides, and faults, and their effects upon the outcrops of beds are dealt with in some detail, and a brief account is given of the ways in which igneous rocks, metamorphic rocks, and mineral lodes are indicated on geological maps. Most of the problems discussed are illustrated from particular areas in Great Britain, and references are given in footnotes to the maps and memoirs of the *Geological Survey* and other publications, where more detailed treatment can be found. The book is admirably illustrated, but the omission of the plates — artistic though these are — would not have lessened materially its usefulness and would have lowered the price, which will certainly not be attractive to the average student.

Handbook of Meteorology: A Manual for Co-operative Observers and Students. By Jacques W. Redway. New York: Wiley and Sons. London: Chapman and Hall, Ltd., 1921. *Price* 24*s. net.*

This text-book of Meteorology by Mr. Redway, Fellow of the American Meteorological Society, is divided into two parts. Part I. is on general prin-

ciples, viz., as the author explains, "a synopsis of the general principles of air science . . ." Part II. is a description of the various instruments used for meteorological work. In Part I. many of the results of fairly recent work have been summarised in a popular way without any mathematics whatever. All the difficult and doubtful points in meteorology are avoided, and the student who already has a good elementary grounding in the principles of meteorology will not find much new knowledge. The author states that the isothermal layer is the plane which separates the stratum of falling temperature from that of stationary temperature. This is not so. The isothermal layer was the name first given to the stratosphere, the stratum of stationary temperature, by Teisserenc de Bort, and the plane that separates the stratosphere from the troposphere, the stratum of falling temperature, is called the tropopause. It has been the purpose of meteorologists to take meteorology out of the domain of inexactitude and place it upon a firm scientific basis. But the author, instead of devoting his space to a detailed explanation of the synoptic weather chart from which forecasts are made (he only gives one illustration), has spent five pages on popular weather prediction, interesting to the student of folklore, but hardly of value to the student of meteorology.

The chief interest in this book is in Part II., where American methods of equipping meteorological stations are set forth. Observers in Great Britain have a somewhat different method of housing their thermometers, placing the maximum thermometer, exposing the dry and wet bulb, and measuring rain, and so on. A Scottish observer therefore, who studies this book to obtain guidance, would learn methods different from those set out in the *Observer's Handbook*, the official book of instructions issued to British observers by the Meteorological Office.

The book is well printed and illustrated—the cloud pictures are particularly good—and the diagrams are clear. J. E. BELASCO.

BOOKS RECEIVED.

The English Village: the Origin and Decay of its Community. An Anthropological Interpretation. By HAROLD PEAKE, F.S.A. 8vo. Pp. 251. London: Benn Bros., Ltd., 1922. *Price* 15*s.*

Human Geography. An Attempt at a Positive Classification, Principles and Examples. By JEAN BRUNHES. Translated by T. C. LE COMPTE. Edited by ISAIAH BOWMAN and RICHARD E. DODGE. 8vo. Pp. xvi. + 648. London: George G. Harrap and Co., 1922. *Price* 25*s.*

A Manual of Belgium and the Adjoining Territories. 8vo. Pp. 595. *Price* 10*s.* 6*d.*

The Climate of the Eastern Mediterranean and Adjacent Countries. 8vo. Pp. 300. *Price* 5*s.* Prepared by the Geographical Section of the Naval Intelligence Division, Naval Staff, Admiralty, London, 1922.

In a Russian Village. By CHARLES RODEN BUXTON. 8vo. Pp. 96. London: The Labour Publishing Co., Ltd., 1922. *Price* 2*s.* 6*d.*

On Secret Patrol in High Asia. By L. V. S. BLACKER, Q.V.O., with an introduction by Major-General Sir GEORGE YOUNGHUSBAND, K.C.M.G. Illustrated. 8vo. Pp. x + 302. London: John Murray, 1922. *Price* 18*s.*

Tibet: Sein geographisches Bild und seine Stellung im Asiatischen Kontinent. Mit 2 Profilen, 11 Abbildungen und 1 Kartenskizze. Von Dr. EMIL TRINKLER. 8vo. Pp. 146. München: Dr. C. Wolf und Sohn, 1922.

The Statesman's Year-Book for 1922. Edited by Sir JOHN SCOTT KELTIE. LL.D., and M. EPSTEIN, M.A., Ph.D. 59th annual publication. Pp. xlvii + 1568. London: Macmillan and Co., Ltd., 1922. *Price* 20*s. net.*

Cambridge County Geographies: Banffshire. By W. BARCLAY. 8vo. Pp. viii + 139. Cambridge: University Press, 1922. *Price* 3*s.* 6*d.*

The Scope of School Geography. By R. N. RUDMOSE BROWN, D.Sc., O. J. R. HOWARTH, O.B.E., M.A., and J. MCFARLANE, M.A., M.Com. 8vo. Pp. 158. Oxford: Clarendon Press, 1922. *Price* 5*s.* 6*d.*

The Coasts of Romance. By CROSBIE GARSTIN. 8vo. Pp. 258. London: William Heinemann, 1922. *Price* 7*s.* 6*d.*

The World About Us. A Study in Geographical Environment. By O. J. R. HOWARTH, O.B.E., M.A. 8vo. Pp. 94. London: Oxford University Press, 1922. *Price* 2*s.* 6*d.*

The Year-Book of the Universities of the Empire, 1922. Edited by W. H. DAWSON and published for the Universities Bureau of the British Empire. 8vo. Pp. 653. London: G. Bell and Sons, Ltd., 1922.

Statistics of the Dominion of New Zealand. 4 vols. 1918 and 1919. Wellington, 1920.

Principes de géographie humaine. PAR P. VIDAL DE LA BLACHE. 8vo. Pp. vii + 327. Paris: Librairie Armand Colin, 1922. *Prix* 25 *fr.*

Human Geography. By J. RUSSELL SMITH, Ph.D. Book Two. Regions and Trade. Med. 8vo. Pp. viii + 471. Philadelphia: The John C. Winston Co., 1922.

My Joy-Ride Round the World. By DOROTHY DIX. With 16 Illustrations. 8vo. Pp. 237. London: Mills and Boon, Ltd. 1922. *Price* 8*s.* 6*d.*

The Andaman Islanders: A Study in Social Anthropology. By A. R. BROWN, M.A. 8vo. Pp. xiv + 504. Cambridge: University Press, 1922. *Price* 40*s.*

The Biology of the Sea-Shore. By F. W. FLATTELY and C. L. WALTON, M.Sc. With an Introduction by J. ARTHUR THOMSON, M.A., LL.D. Pp. xvi + 336. London: Sidgwick and Jackson, Ltd., 1922. *Price* 16*s.*

L'Educazione del Geografo. By RAFFAELE RESTA. Pp. 412. Milan: Albrighi, Segati and Co., 1922. *Prezzo* 10 *Lire.*

Poland Reborn. By ROY DEVEREUX. 8vo. Pp. 256. London: Chapman and Hall, Ltd., 1922. *Price* 15*s.*

The Expansion of Britain from the Age of Discoveries. A Geographical History. By W. R. KERMACK, M.C. 8vo. Pp. 112. London: Oxford University Press, 1922. *Price* 2*s.* 6*d.*

The Human Geographies. Book II: The Atlantic Hemisphere. By J. FAIRGRIEVE, M.A., F.R.G.S., and ERNEST YOUNG, B.Sc., F.R.G.S. 8vo. Pp. 295. London: George Philip and Son, Ltd., 1922. *Price* 3*s.*

Nouvelle Géographie Universelle. Par ERNEST GRANGER. 3me partie. Paris, 1922. Librairie Hachette.

Kartenkunde. By Dr. M. GROLL. I. Die Projectionen. Pp. 116. Berlin: Walter de Gruyter and Co., 1922.

Cambridge Geographical Text-Books. Senior. By G. F. BOSWORTH, F.R.G.S. 8vo. Pp. xiv + 507. Cambridge: University Press, 1922. *Price* 7*s.* 6*d.*

Scottish Colonial Schemes, 1620-1686. By GEORGE PRATT INSH, M.A., D.Litt. 8vo. Pp. 283. Glasgow: MacLehose, Jackson and Co., 1922. *Price* 12*s.* 6*d.*

Leinster. East and West. Edited by GEORGE FLETCHER, F.G.S., M.R.I.A. 8vo. Pp. xiii + 256. Cambridge: University Press, 1922. *Price* 7*s.* 6*d.*

Connaught. Edited by GEORGE FLETCHER, F.G.S., M.R.I.A. 8vo. Pp. xi + 170. Cambridge: University Press, 1922. *Price* 6*s.* 6*d.*

"The Queen" Book of Travel: A Guide to Home and Foreign Resorts. Com-

piled by the Travel Editor [M. Hornsby, F.R.G.S.]. 15th Year. 8vo. Pp. xii + 593. London: The Field Press, Ltd. *Price* 4*s. net.*

The Lake of Geneva. By Sir Frederick Treves, Bart., G.C.V.O., C.B., LL.D. Illustrated. 8vo. Pp. 347. London: Cassell and Co., Ltd., 1922. *Price* 25*s. net.*

Down the Columbia. By Lewis R. Freeman. With Illustrations. 8vo. Pp. xx + 383. London: William Heinemann, 1922.

Christianity and Civilisation in the South Pacific. By W. Allen Young. (The Robert Herbert Memorial Prize Essay, 1920.) 8vo. Pp. 135.

Legendary Islands of the Pacific: A Study in Medieval Geography. By William H. Babcock. 8vo. Pp. 196. New York: American Geographical Society, 1922. *Price* $3.50.

The Dominion of Canada with Newfoundland and an Excursion to Alaska. By Karl Baedeker. 14 maps and 12 maps. Leipzig: Karl Baedeker, 1922.

Colonial Reports Annual.—British Honduras (1110); Malta (1111); Uganda (1112); Leeward Islands (1113).

Svenska Turistforeningens Årsskrift, 1922. Stockholm.

Official Year of the Commonwealth of Australia. 1901-1920. No. 14, 1921. By G. H. Knibbs, C.M.G. Melbourne, 1921.

Dent's Historical and Economic Geographies. By Horace Piggott, M.A., Ph.D., and Robert J. Finch, F.R.G.S., Great Britain and Ireland. Illustrated. 8vo. Pp. xi + 351. London: J. M. Dent and Sons, Ltd., 1922. *Price* 4*s.* 6*d.*

Les Grandes Marches des matières premières. Par Professeur Fernand Maurette. 8vo. Pp. vi + 198. Paris: Armand Colin, 1922. *Prix* 5 *fr.*

Mysterious India: its Rajahs—its Brahmins—its Fakirs. By Robert Chavelot. Illustrated. Translated by Stimson Brooks. 8vo. Pp. xi + 277. London: T. Werner Laurie, Ltd., 1921. *Price* 16*s.*

Tramping with a Poet in the Rockies. By Stephen Graham. With 38 emblems by Vernon Hill. 8vo. Pp. xii + 279. London: Macmillan and Co., Ltd., 1922. *Price* 8*s.* 6*d.*

A Geography of the Bible. By Eleanor K. Howarth. Edited by O. J. R. Howarth, O.B.E., M.A. 8vo. Pp. 96. Oxford: Clarendon Press, 1922. *Price* 2*s*

Between Two Continents. Notes from a Journey in Central America, 1920. By H.R.H. Prince William of Sweden. 8vo. Pp. 246. London: Eveleigh Nash and Grayson, Ltd., 1922. *Price* 15*s.*

Africa in the Making. By H. D. Hooper. 8vo. Pp. 144. London: United Council for Missionary Education, 1922. *Price* 2*s.*

Handbook of Commercial Geography. By George G. Chisholm, M.A., B.Sc., [Edin.]. 8vo. Pp. xv + 824. Ninth Edition. With maps and diagrams. London: Longmans, Green and Co., 1922. *Price* 25*s. net.*

People and Places: A Life in Five Continents. With Illustrations and Map. 8vo. Pp. x + 337. London: John Murray, 1922. *Price* 16*s.*

Through Yorkshire. The County of Broad Acres. By Gordon Home. 8vo. Pp. x + 182. London: J. M. Dent and Sons, Ltd., 1922. *Price* 2*s.*

A Regional Geography of the Six Continents. Book VI. South America. By Ellis W. Heaton, B.Sc. 8vo. Pp. 85. London: Herbert Russell, 1922. *Price* 1*s.* 4*d.*

La Rhodesie. Son passé—son avenir. Par Georges Blondel. 8vo. Pp. viii + 260. Paris: Plon Nourrit et Cie, 1922. *Prix* 7 *fr.*

Bartholomew's Pocket Guide to Melrose, Abbotsford, etc. The Land of Scott. 5th Edition. Pp. 64. Edinburgh: John Bartholomew and Son, Ltd., 1922. *Price* 2*d.*

NEW MAPS AND ATLASES.

EUROPE.

ORDNANCE SURVEY OF SCOTLAND.—The following publications were issued from 1st January to 31st March 1922 :—

One-Inch Map. Printed in Colours. Price, unmounted, 2s. each. Tourist Map.—Rothesay and Firth of Clyde.

Six-inch and Larger Scale Maps.—Six-inch Maps (revised). Full sheets with contours in red. Price 4s. each. **Dumbartonshire* (Det.)—*Stirlingshire.*—Sheet **N 30**. *Lanarkshire.*—Sheet **9A, 14**. **Linlithgowshire.*—Sheets **N** (**1** and **2**), **3, 11, 14**. **Stirlingshire.*—Sheets **N 25, N 31**.

* Revised on new meridian, the sheet numerals therefore differ from those of the previous Revision.

NOTE.—It has been decided by the Ministry of Agriculture and Fisheries that the selling prices of Ordnance Survey Large Scale Maps shall, from 1st April 1922, be increased as follows :—

Each 1/2500 sheet from 5s. to 6s. 8d.
Each 1/1250 Enlargement from 6s. to 7s.
Each 6 inch full sheet from 4s. to 5s.
Five feet London Land Registry Series, 4s. to 5s.

The price of a Six-Inch quarter-sheet will remain as at present, viz. : 1s. 6d.

The prices of all the small scale maps, viz. : those on the scale of one-inch to one-mile and smaller scales, will remain as at present.

The charge for preparing each special sheet on the scale of 1/1250, and providing 20 copies, will be increased from £6 to £7.

GEOLOGICAL SURVEY OF SCOTLAND.—The following publications were issued from 1st January to 31st March 1922 :—

One-inch Maps. Colour Printed. Solid and drift editions. Price 3s. each. Sheet **37**.—Argyllshire, Districts around Loch Avich, Loch Awe (south half), Loch Fyne (upper half), Loch Eck, Loch Goil, and Loch Long (central portion), Ford, Inverary, Lochgoilhead.

Six-inch Maps.—With geological lines ; uncoloured. Price 2s. 3d. each. *Lanarkshire.*—8 SW. ; 17 SW. ; 18 SW. ; 24 SE. *Renfrewshire.*—7 NE., 9 SE.

ADMIRALTY CHARTS.

Scotland, West Coast.—River Clyde, Dumbarton to Glasgow, April 1922. No. 2007. Price 3s. *Admiralty, London.*

GEOLOGICAL SURVEY OF IRELAND.—Showing distribution of Peat Bogs and Coalfields. 10 miles = 1 inch. Price 5s. net.

BARTHOLOMEW'S MAP OF SPAIN AND PORTUGAL. Scale 1 : 2,000,000.

BARTHOLOMEW'S MAP OF ITALY.—Scale 1 : 2,000,000. Price, each, 1s. 6d. net on paper ; 3s. net on cloth.

John Bartholomew and Son, Ltd., Edinburgh.

These orographically coloured maps are valuable additions to the well-known "World Survey Series."

CARTA GEOGRAFICA DELLA NUOVA EUROPA.—Scale 1 : 6,000,000. Price 6 Lire.

Istituto Italiano d'Arte Grafiche, Bergamo.

AFRICA.

MAPA MILITAR DE MARRUECOS.—Carta Provisional Zona Occidental. 1 : 150,000. February 1922.

Supplement 9 to *Revista Hispano Africana*, March-April, Madrid, 1922.

So much labour appears to have been spent on this map that one wonders if it would not have been possible to have attempted a more scientific representation of the country. Would it not have been possible, for instance, to have shown the relief by contouring instead of by the uninformative hachuring? And why has all indication of latitude and longitude been omitted?

MAP OF CENTRAL AND SOUTH AFRICA, 1922.

Offices of "South Africa," London.

The 1922 edition of this useful railway map.

NORTH AMERICA.

CANADA. STANDARD TOPOGRAPHICAL MAP.—1 : 500,000.

Sheet 9. Ontario and Quebec. Nipissing Sheet.
Sheet 32. " " Harricanaw Sheet.
Sheet 33. Quebec. Chibougamau Sheet.

Department of the Interior, Canada.

MANITOBA, SASKATCHEWAN, AND ALBERTA.—Showing the number of Quarter Sections available for Homestead Entry. 35 miles to an inch. 1922.

Department of the Interior, Canada.

GEOLOGIC ATLAS OF THE UNITED STATES. Folio 213. New Athens-Okawville, Illinois. Price 25 cents.

United States Geological Survey, Washington.

UNITED STATES SURVEY. Topographic Maps issued from November 1921 to March 1922. The figures after the name of each State indicate the number of sheets received.

Scale 1 : 62,500.—California, 3; Georgia, 3; Kentucky, 1; Michigan, 1; Mississippi, 3; Montana, 1; New Hampshire, 1; Virginia, 2; Wyoming, 1; West Virginia, 1.

Scale 1 : 31,680.—California, 8; Texas, 4.

United States Geological Survey, Washington.

MAP OF THE WEST INDIES. Prepared for the West Indies Committee, under the direction of Mr. Algernon Aspinall, C.M.G., Secretary to the Committee. In sheet form. 7s. 6s. net. *George Philip and Son, Ltd., London.*

AUSTRALIA.

BARTHOLOMEW'S MAP OF SOUTH EASTERN AUSTRALIA. 1 : 2,500,000. World Survey Series. Price 2s. 6d. net on paper, 5s. net on cloth.

John Bartholomew and Son, Ltd., Edinburgh.

This is probably the best general map of the area which has been published. It shows the relief of the country very effectively by layer colouring.

ATLAS.

WORLD ATLAS OF COMMERCIAL GEOGRAPHY. Part II. Water Power of the World. *United States Geological Survey, Washington.*

In view of the increasing amount of attention paid to water as a source of power the publication of the present atlas is opportune. The text treats the various sources of power in detail, while the proportion of developed and potential water-power is graphically indicated on the maps.

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

HUMAN GEOGRAPHY: FIRST PRINCIPLES AND SOME APPLICATIONS.[1]

By Marion I. Newbigin, D.Sc. (Lond.).

In his address to this Section in Edinburgh last year, my predecessor, Dr. Hogarth, devoted some time to a consideration of the position of Geography in the Universities of this country. He had no difficulty in showing that, from various points of view, this position still leaves much to be desired. My present concern, however, is not with the actual facts, but with a deduction which naturally follows from them. If it be true that the Geographical Departments of the Universities are, in most cases, insufficiently staffed and equipped, then it is surely clear that, despite all the progress which has been made in recent years, we have largely failed to convince the great mass of educated opinion of the value of our subject. For University chairs are only endowed, and departments equipped, when those established in educational high places realise the growing importance of the subject concerned. Usually, also, before that realisation can take place there must be a driving force in the shape of a body of enthusiasts, able and willing to convince the general public that the advance is necessary in the interests of the community.

Now, in the case of geography the body of enthusiasts does exist: where we have failed, as I think, is in making continued and determined efforts to convince others. The time seems to me to have come for a determined missionary effort, a deliberate attempt to make clear to the ordinary citizen that geography, in its modern aspects, is a subject of direct interest and value to him in his daily life.

Let me take first a single minor example of the need for such a

[1] Presidential Address to Section E (Geography) at the Hull Meeting of the British Association.

geology. All those who have had anything to do with the arranging of lecture programmes for geographical societies are aware how largely accounts of exploration bulk in these. It may be said generally that any committee meeting for such a purpose turns first to a consideration of what returned explorers are likely to be available at the time. More than this, whether geographers in the technical sense are well represented on such bodies or not, there is a general consensus of opinion that an explorer who has come through great dangers, or shown conspicuous personal courage, is, for a society which depends on public support, a much more valuable lecturer than one who has merely done careful and painstaking work, with no element of drama in it.

This means that even that section of the public sufficiently interested in geography to join a geographical society regards the subject as primarily concerned with exploration, leading to the description of unknown or little-known regions of the earth. Even so, its interest requires stimulation by the personal factor. If this be the attitude of a somewhat specialised public, what is that of the world outside?

I do not think there can be much doubt as to the answer. In so far as that public is highly specialised and consists of students either of those separate sciences from which geography obtains much of its material, or of such subjects as history in its different branches, it tends in many cases to regard geography with tolerant contempt. Of the unspecialised public it may be said generally that the subject in its modern developments has scarcely come within its range of vision. Its older members, especially, are for the most part convinced that they learnt "geography" at school, as they learnt reading, writing, and arithmetic there, and that, since mountains and rivers, capes and bays and the rest remain where they were, there is little left to be studied or investigated.

It seems to me, therefore, that the most clamant need at the present time is a continuous attempt to make it plain to the community at large that the main interest of geography is not in its facts as such—for if geography ceased to exist the geologists, meteorologists, botanists, zoologists, and so forth would continue to collect most of these. Rather does it lie in the way in which the geographer studies these facts in their relations to each other and to the life of man. Further, whatever place the study of the human response to the surface phenomena of the earth should take in the subject considered as a whole—and the topic was fully discussed by Dr. Hogarth last year—there can be no doubt that it is the aspect which makes the widest appeal. When, for example, we can take the sheets of a good atlas of physical geography and show that the facts represented there can be made to yield deductions of great interest and value to every one, then we are going far to persuade the members of the public of the importance of geography; and not until they are so persuaded can we hope that the subject will obtain in the higher institutions of learning the position to which we believe it is entitled.

Now, I am well aware that such deductions have been and are being drawn by geographers, both at home and abroad. But their conclusions have so far reached only a very limited audience. It has seemed to me that an Address to this Section gives an opportunity of discussing certain interesting points of view which do not seem to have been fully treated hitherto. In so far, however, as I am addressing an audience of geographers in the technical sense, I wish it to be clearly understood that what I have to say is to be regarded less as a contribution to geographical science than as an attempt to carry out that forward policy which seems to me essential at the moment. Even if I fail to carry you with me throughout, I may at least hope to stimulate some of you to promote the aim already set forth by other and better methods.

For the reason already given I propose to take certain points in regard to the human response to surface phenomena for special consideration. Now, it is a somewhat curious fact that, although geographers are agreed that man's intelligence and power of acquiring and transmitting knowledge so differentiate him from animals that it is necessary to distinguish between human geography and animal geography ; yet, so far as I am aware, little detailed consideration has been given to the question as to the respects in which his response to environmental conditions differs from that of the animals. This is unfortunate, more especially since, thanks to the biologists, we have a fairly clear idea as to the mechanism of the response in the latter case.

If, for example, we take two familiar animals, such as the rabbit and the common hare, we find that, though belonging to the same genus, and generally resembling each other in structure, they show certain minor differences in bodily form and habits fitting them for the environments in which they respectively live. Thus the long legs of the hare enable it to maintain the swift movements upon which it depends for escape from its foes, while the rabbit, inhabiting sandy uplands instead of open country, finds safety underground, and needs only to be able to move swiftly over short distances. Similarly, the young of the rabbit, born within the shelter of the burrow, are more helpless than the leverets, brought forth virtually in the open. The biologists are broadly agreed that these differences are an adaptive response to the different environments of the two animals. In explaining the origin of that adaptive response, most of them lay stress on the two factors of fixation to a particular environment and isolation—actual or physiological—within it, so that incipient variations are not swamped by intercrossing.

Now when we turn to look at man, two facts are at once apparent. In the first place, at the present time, he does not appear to respond to environmental influences by adaptive modifications of bodily form. Secondly, there was certainly a time, before he had come fully to his

heritance when he did so respond. We know this because the anthropologists are agreed that while man once ran into a number of species—and of genera—now all living human beings belong to the same species, and even the races show marked signs of being in process of becoming swamped by intercrossing. In other words, there was a time when there was no human geography, when men reacted to the sum-total of the conditions as an animal does; but that time appears to have largely passed.

But there is certainly still a human response to environmental conditions. What precise form does it take? To a certain minor extent, apparently as an inheritance from what I regard as essentially the pre-human period, there is a direct structural response. One need only mention the presence of peoples with thin, almost unpigmented skins in Western Europe, and the tendency to increased pigmentation alike as the Tropics and the Poles are approached. But though determined efforts have been made to correlate in detail the physical characters of the great races with the climate and relief of the areas where they are presumed to have originated, most of these correlations remain uncertain and speculative.

Man's real response to the surface phenomena of the earth takes the form of a communal, not an individual response. It is the aptitudes which the members of a community display, the tools which they use, the kind of knowledge which they accumulate, their modes of organisation, their type of material wealth, their traditions and ideals, which show the environmental imprint most closely, far more closely than the colour of their skins or the shape of their heads.

But when and how did the change in the two modes of response come about? To answer this question let us recall what has been already said as to the importance of fixation and isolation in the case of animals. The surface of the earth is almost infinitely diverse, and what the biologists call natural barriers, the major barriers like deserts, seas and mountain chains, or the minor ones produced by the transition from one type of plant formation to another—*e.g.* from the forested river valley to the grass-covered upland—separate different types of environment, and form obstacles to the distribution of most land animals. There must have been a time when groups of men, no less than the pigs in the forest or the asses on the steppe, were firmly gripped by the physical conditions, were isolated from other groups, forced to become fitted by structure and habit for a particular set of conditions, or to die out. But with his growing intelligence man escaped from this iron grip, learnt to make virtually every part of the surface yield enough for survival, proved capable of overcoming every kind of natural barrier. When this occurred the old mechanism of adaptation largely—though not completely—ceased to work. Evolution then might have ceased also, man might have become specially fitted to no environment because fitted for all, if the factors of fixation and isolation had not, in quite a different fashion, obtained a new hold.

He ceased, save in relatively few parts of the earth's surface, to be a continuous wanderer. He settled down afresh on particular parts of it, and there learnt to use his increasingly complex brain not only in utilising to their full the natural resources, but also in modifying the local conditions so that new resources became available. In other words, I wish to suggest that the cultivation of the soil was the great agent in ensuring the new type of fixation to a particular area which once again made evolution possible. But evolution now took the form of increasing development of communal life, or, in other words, the growth of what we call civilisation is the precise equivalent of specific differences in plant or animal.

Further, just as, in the case of the animal, isolation is necessary before an incipient species can become fixed, so in the case of human communities a measure of protection from the inhabitants of neighbouring areas—a measure, that is, of isolation—is essential before civilisation can develop.

Again, in the case alike of plants and animals we know that where the local conditions are such that the incipient species is limited to a very narrow area, there highly specialised forms of adaptation may occur, as they do, for example, on many islands, or in isolated mountain chains; but that specialised type of development is associated with the loss of the capacity to vary, to acquire adaptations fitting the organism for a wider area. So in the case of human communities where the isolation is too complete, the power of adaptation tends to be lost, and such groups, though their civilisation may, along its own lines, be of a highly specialised type, are easily overwhelmed when contact with the outside world does occur, just as island animals tend to disappear before introduced forms.

Now with these general statements as starting-point, let us consider some facts in regard to the development of civilisation in Europe and the margins of the adjacent continents.

In this area history has seen three successive great foci of civilisation, each based on well-marked and distinctive geographical conditions. The development of the three types has been successive and not simultaneous, and there has thus been a steady shift in time of the main focus, a shift westward and north-westward. The three types of human societies alluded to are, of course, (1) the river-valley type as represented in Babylonia and early Egypt; (2) the Mediterranean type on part of the seaboard of the Midland sea: (3) the forest type of Europe proper, itself becoming progressively more and more influenced by the greater ocean to the west, so that forest influences have steadily given way to maritime ones.

We have to ask ourselves, then, what effects the factors already considered have had on the origin, growth, and further development, or decay, of each of these three. In other words, what in each case were the geographical causes which first fixed man to a particular area in which he was able to cultivate useful plants? What gave the necessary

isolation and safety during the early stages? Finally, to what extent were the conditions such as to give that necessary safety without leading to the loss of the power of continued adaptive modification, as expressed either in the capacity to spread over adjacent areas showing progressively increasing differences, or in that of responding to changes within the home area?

In the case of the river-valley areas, as represented in the Tigris-Euphrates region and the Nile valley, and in that of the Mediterranean seaboard, several geographers, among whom Prof. Myres may be especially mentioned, have discussed the conditions favourable to the early development of civilisation. It is therefore not necessary to consider the geography of these areas in detail. But, beginning with Babylonia and Egypt, I should like to put the causes which seem to me to have promoted fixation quite briefly. Among them we must certainly include the primitive natural resources, scanty though these doubtless were. The birds of the valley marshes, the relatively small number of mammals, the fish of the rivers, must have supplied a certain amount of animal food. The date palm, in the Tigris-Euphrates areas at least, would, even in its wild state, doubtless yield a fruit of some value in the very early days.

But as an important factor in the development of cultivation, I would lay especial stress upon the presence of what the botanists call the "open" plant formation. Native trees, as we know, are very few, the date palm, one of the most characteristic, being strictly limited in distribution by its need for water at the roots. For the greater part of the year the ground between the scattered trees is naturally either devoid of vegetation, or this is represented only by a few desert plants. But after the periodic flooding by the rivers, an abundant growth of vegetation springs up. The plants may be annuals, whose seeds ripen as the ground dries, and lie dormant till moisture comes again; or they may be bulbous and tuberous forms, having but a short period of vegetative activity, but possessing underground stems capable of withstanding prolonged drought. The result is that man did not require to clear land for crops, Nature periodically cleared it for him. He had but to make the fairly obvious deduction that water alone was necessary for the apparently barren soil to blossom like the rose, and from all the choice of plants which the flooded ground offered, to pick out those of some use to him, and learn to suppress the rest. As has often been pointed out, he did not need to trouble greatly about renewing the fertility of his lands, for the flood-water did this for him.

So soon as he had learnt the initial lessons of cultivation, he was tied to the area normally flooded at certain seasons, or to which he could lead the flood-water. He intercalated his crops along one of Nature's lines of weakness, in a transitional area which passed periodically from one climatic zone to another, being, according to the seasons, either a desert or fertile. Fixed in this fashion he could, and did,

adapt his mode of life to the natural conditions as precisely as ever bird or insect became structurally fitted for life on an island.

The bordering desert ensured isolation, and, continuing the island metaphor, we may say that it represented the sea. Its effect was to throw the whole energy of the community towards the centre, for the periphery formed an area in which the characteristic mode of life could not be practised. Similarly, it gave protection, for it is unsuited to any save a highly specialised culture, which must have been of relatively late origin. So far as it formed the boundaries of the incipient State, therefore, the desert constituted a barrier preventing the ingress of potential foes. In neither case, of course, was the desert rim complete, and the conditions upstream varied in the two areas, and were, as has been often pointed out, from the point of view of safety, on the whole less favourable in the case of Babylonia than in that of Egypt.

As to the third point, it is, I think, easy to show that while the isolation of the areas was markedly conducive to the rise of civilisation and to its growth up to a certain point, in the long run it became a danger. In the first place, the contrast between the belt which could be watered and that to which, with the means available, water could not be carried, was exceedingly sharp. There was little possibility of a gradual spread into areas becoming slowly but progressively different, where new aptitudes could be acquired, new experience gained, and new forms of wealth stored. Specialisation was high within the favoured tract, but the limits set by Nature could not be passed.

Again, as has often been noted, the conditions led necessarily to a centralised and imperialistic form of social organisation. If there was a sharp line of demarcation between the areas which could and could not be watered, there were great possibilities in the direction of extending by artificial means the belt over which the flood-water spread. This involved the gradual growth of an elaborate irrigation system, and for the maintenance of this a centralised power was essential. This brought with it, as a correlated advantage, the possibility of organised defence when developing neighbouring communities attempted to encroach. But if the attack was made with sufficiently powerful forces, the centralisation became a menace. An attacking foe able to destroy or damage seriously the irrigation system could cut off at its source the basis of prosperity, and render reconstruction on the old scale almost impossible. In other words, the community became adapted to artificial conditions created by itself ; if and when those conditions were destroyed, the survival of the old culture became impossible.

Turn next to the Mediterranean region, that is to the area in which the typical Mediterranean climate prevails. In so far as the native plants are concerned, this area shows certain broad general resemblances to the river valleys, with some striking differences. Thus the characteristic plant formation is alternately opened and closed : closed during the cooler season of the year, when the winter rains cause a

least but intense growth of annuals and bulbous or tuberous plants; open during the drought of summer, when the trees and shrubs stand apart from each other with bare earth between. But the contrast is due, as indicated, to the rainfall conditions, not to flooding. There is thus no natural renewal of fertility, and plants which require much water can only thrive in the cooler season, so that growth is less intense than in either the Nile or the Euphrates-Tigris valley.

On the other hand, because of the climatic conditions, trees and shrubs, alike as regards individuals and species, are far more numerously represented in the Mediterranean region. Here, however, we come to a very curious fact, which, although it is familiar enough, does not seem to have been considered in all its bearings. This is that, despite the (relative) wealth of native species of shrubs and trees, those which are cultivated seem to have been for the most part introduced. This is apparently true even of the supremely important olive. The tree occurs in the fossil state, and the olivaster of the maquis is believed by many to be truly wild, not feral. Yet it would appear almost certain that the *cultivated* olive was introduced, into Europe at least. The same thing is true of great numbers of other species, and of all the fruit-bearing trees now grown in the area there are few indeed which can be reasonably regarded as having originated there as cultivated forms. Now, the deduction that I would draw is that the Mediterranean area is one in which lessons first learnt elsewhere could be easily practised, but one rendered unsuited by the natural conditions for the taking of the first steps. Putting the point in another way, I would suggest that when we see, in any part of the area, olives or fig-trees rising from above a plot of wheat or barley, we have to say to ourselves that this is an adaptation to a new set of conditions of the *type* of cultivation first practised on any scale in Babylonia or Egypt, olive or fig representing date palm and the accompanying trees, the narrow plot of corn the local modification of the broad fertile fields of the river valleys.

Man was doubtless first attracted to the area, as in the case of the river valleys, by the natural resources, small though these must have been, even with the addition of the sea fisheries. He became fixed to it when he learnt that the hill-spurs gave safe sites for settlements, while affording easy access to the slopes on which his special form of intensive cultivation could be carried on. That form, as already suggested, was a derived and not an original one. He replaced the native trees and shrubs by useful cultivated varieties or species, which had, certainly for the most part, originated elsewhere. He intercalated short-lived annuals like corn crops and beans along the line of weakness indicated by the periodic opening and closing of the natural vegetation. But one of his great difficulties was always that the absence of much level land and the climatic conditions rendered the growth of such crops relatively difficult, much more difficult than in the river valleys.

If we think of the early settlements as showing a general resemblance to the Berber villages of the Algerian Atlas to-day, we realise that they

were more or less isolated the one from the other, so that the social polity was of a wholly different type from that existing either in Babylonia or in early Egypt. But, and this seems to me important, although the natural conditions—especially the fact that fertility was limited to certain areas—made a measure of isolation inevitable, yet the sea gave a possibility of free movement in all directions which was absent in the river valleys. Thus oversea, if not overland, spreading could take place, and the changes in the geographical conditions as the sea is traversed westward are relatively small, not outside the limits of adaptation. Thus we have the spread of the higher forms of Mediterranean culture from the eastern end of the sea towards the west, with the founding of new settlements of generally similar type to the old. Greece could, and did, send daughter colonies to Sicily, and those colonies broadly repeated in their new homes the conditions which they had left in the old. This possibility of free movement brought with it a wider range of adaptability, a constant willingness to profit by new experiences, which has proved of enormous value to the world at large.

But with all its advantages the Mediterranean area, as already stated, had the great disadvantage that bread-stuffs were difficult to produce in quantity. Two methods of getting over that difficulty could be and were practised. For example, the ancient Greeks, having, it would appear, learnt the lesson from the Phœnicians, dared, in course of time, to descend from their hill-spurs to the sea-coast, in order to supplement the scanty resources of their limited lands by sea-trading. After a long interval the mediæval cities, especially of Italy, did the same thing on a greater scale, and with the advantage of a wider market. Between the two periods Rome tried the other possible method, that of holding in subjection the areas, outside that of the characteristic climate, which were corn-producing. Her failure was, at least in part, due to geographical causes. The great advantage of the method of sea-trading was the increase in the power of adaptation which it brought, as a result of the continual peaceful contact with other lands and other peoples. The decay of the splendid mediæval cities of Italy came when the Mediterranean ceased to be a great highway of commerce, and the vivifying breezes from the outside world which had swept through it took another course —once again, that is, a civilisation based upon a delicate adjustment to a particular set of conditions fell when those conditions changed.

Let us turn next to the third great area where, comparatively late, a complex civilisation grew up, that of the forest belt of Central and Western Europe. Here the conditions appear relatively so unfavourable that man could scarcely have solved the problem of fixing himself permanently to particular areas, and adapting himself to them, were it not for the help of the experience gained elsewhere. The great agent in transmitting that experience was, of course, first the Roman Empire, and then the Church, which was the direct heir of the Empire.

The essential difficulty here was that the characteristic plant formation was the closed temperate forest. At first sight there appears to be

within it no line of weakness along which cultivated plants can be introduced, and the establishment of cultivation seems to depend upon the complete destruction of the natural vegetation, involving the slow and peculiarly laborious clearing of the forest. The significance of this is admirably illustrated by Mr Delisle Burns when, in his *Greek Ideals*, he contrasts Aristophanes' laudation of the agricultural life in the *Peace* with that of the free and noble life of the forest as set forth by Shakespeare in *As You Like It*. In the one case the fig-cakes and the figs, the myrtle and violets by the well, the olives, the beans, the barley and the grapes, the rain which God sends after the sowing, which are the elements in the picture, all speak of man's age-long endeavour to mould Nature; but the merry life under the greenwood tree speaks of a thin, scattered population, still finding, in theory at least, that Nature unaltered yields all he needs.

Had the temperate forest been in point of fact as continuous as we are apt to assume, the problem would have been so difficult that the hunter's life in the forest might have lasted much longer than it did. We know of course that there were always "islands" in the sea of green, and of these the most important, from the point of view of the development of cultivation, were the loess areas and the lower uplands, especially those over chalk. In the former case the friable, well-drained soil seems to have carried originally but scanty trees; clearing was therefore fairly easy, and the cleared soil proved exceedingly fertile. In the chalk uplands the local conditions made tree growth difficult or impossible, so that land was again readily available for crops or pasture.

We have, therefore, as our starting-point in this case scattered settlements in the woods—not compact ones like those of the Mediterranean region. In essentials these were doubtless quite comparable to those made by fugitive Serbs in the Shumaja, from which modern Serbia finally took origin, though the first foci were almost certainly the natural clearings already mentioned. As in the case of the Serbs, the basis of life was a combination of pastoral industries and arable farming, the pig being the most important source of animal food, and itself finding most of its food in the woods marginal to the settlement.

As to the next stages, the surrounding wood must be regarded from two points of view. Initially it formed a protection, the protective influence being strongest where the ground was well drained, owing to the dense thickets which covered the marshy ground. But, in contrast to both the types of region already considered, given the necessary tools for the clearing of the land, the particular type of cultivation could be extended almost indefinitely on the level, while leaving the woods on the rising ground to supply the necessary fuel, building material, and pannage for the swine. This was a great advantage, but it meant that the necessary protection was soon lost.

Now, in North-Western Europe, that protective influence was peculiarly necessary for one geographical reason, as it was on the

eastern margin of the continent for another. It was necessary in the west especially, because the sea-coasts, owing to the local wealth of fish, early attracted population. But in many regions those coasts, exposed to the oceanic type of climate in its most pronounced form, were unsuited to cultivation. At the same time, on account of their sheltered inlets, parts of those coasts were well fitted to breed a seafaring folk. Unable, or able only to a very small degree, to supplement their natural sources by cultivation, having at the same time command of the sea, those seafarers tended constantly to raid the painfully cleared and cultivated lands of their more fortunately situated neighbours. These, as many old tales inform us, did, time and again, find their encircling woods a protection. We must suppose, therefore, that the tendency to clear more and more land would be checked by this need for the shelter of the woods.

But it seems to me that we may regard the growth of feudalism, from one point of view, as an adaptive device by which the growing agricultural settlements obtained, at a price, the necessary protection. Feudalism in the form, for example, in which it grew up in England before the coming of the Normans, was a means of ensuring the existence of a kind of organisation which permitted clearing of forest land to go on indefinitely, while diminishing the risks of perpetual raiding.

It was also, more especially in Eastern Europe, something more, for it tended to fix the cultivator to the land. The tendency to wander may be said to be almost universal in the case of forest-dwellers carrying on primitive agriculture. Its wide distribution is due to the great difficulty of maintaining there the fertility of the land, more especially when exhausting crops, like the different kinds of grain and flax, are grown. To this day, when we contrast the advanced agriculture of Western Europe with the more primitive type practised in the Eastern part, we have to remember that the Western Europeans have largely evaded their problem by using their easy access to the great ocean to draw upon all parts of the world for feeding stuffs for their large herds of cattle, and mineral fertilisers for their arable lands. In early days the difficulty of keeping many cattle through the winter scarcity, combined with the merely moderate fertility of the deforested lands, made the restoration of material taken out by the crops a matter of great difficulty, got over by a variety of devices, including, of course, fallowing.

Feudalism helped in the solution of this problem by checking the natural tendency of the cultivator to abandon exhausted lands and move on to new ones. But even apart from this particular device, the problem of maintaining fertility had to be tackled early in the West, because the relief made the forest far less continuous, far less uniform, than in the East. It must have been obvious quite early that it was not illimitable. Conditions were different in the forest region of the East, where the vast, almost uniform plains, the absence

of [illegible] the breadth of the continent, made the forest a more permanent, a more unmanageable element than in Western Europe. Here, therefore, we find in suggestive combination two peculiar features. The first is that the wandering instinct, the instinct that brought the Slavs from their eastward forest home far into Central and Southern Europe, still persists. It is said to be quite well marked in parts of Russia, despite all the artificial checks which existed under the old *régime*. Part of the difficulty of the Slav problem also lies in the fact that the effect of the habit of small groups of wandering constantly from one wooded tract to another is written large on the ethnological map.

The second peculiar feature is that feudalism, and feudalism in a very harsh form, survived here far longer than in Western Europe, and in fact, if not in law, had scarcely disappeared when the war broke out. I would suggest that the great significance of this form of social policy here was that it helped to counteract the effects of the natural conditions, that it was fundamentally an artificial device for rendering the population stationary, and enabling it to adapt itself to the local relief and associated phenomena.

Now, whatever its value in earlier days, the present chaos in Eastern Europe shows clearly enough that ultimately it checked social evolution, and became a serious menace. It was fundamentally the erection of an artificial barrier round the rural community, and led to the apparent loss of the power of slow adaptation to changing conditions, alike on the part of the overlords and of the freed serfs.

But in the Eastern chaos another factor has to be borne in mind. In the Old Russia, south of the forested area, and extending both into what is and was Rumania, lie the great treeless plains. Parts of these, as the nineteenth century showed, are extraordinarily fertile and well adapted for cereal production. But, from the point of view adopted here, they suffered from the enormous disadvantage that there is nothing in the natural conditions to fix their inhabitants to special areas, thus enabling them to acquire qualities fitting them for life there; nothing to give protection from constant inroads from Asia. Literally wastes for long centuries, these plains were for the most part ultimately incorporated in Imperial Russia, and deliberately colonised, often with colonists from a distance. The colonists were brought from areas of other characters, possessed traditions and aptitudes due to long experience of different geographical conditions, and were in the grip of a Government which had itself evolved under those conditions. There was thus no question of the possibility of the evolution of a type of culture bearing the imprint of the local conditions.

In consequence Russia to-day—as well as to some extent Rumania—is faced with a double problem. In both regions parts of the consequent lands are fitted for the mixed cultivation of the forest belt, and in them the old social policy has shown itself unfitted for modern conditions, and a new one has yet to be evolved. Other parts, again, have

never developed even an imperfect social policy which was a response to their own local environment. Their apparent prosperity, till the outbreak of the war, was due to the fact that they were, economically though not politically, of the nature of colonies in relation to the industrialised West, were, fundamentally speaking, the equivalents of Imperial Rome's corn-producing lands in North Africa and the Danubian plains. The chaos in Eastern Europe is thus having a reflex disturbing effect upon the West. The West has lost an important market, but that is perhaps in itself less important than the fact that over a large tract of European land man and his environment have been thrown out of gear, a catastrophic condition which inevitably disturbs equilibrium elsewhere. Just as in the latter days of the Roman Empire disturbances in the marginal corn-producing lands shook and ultimately overthrew the centre, so are the centres of Western European civilisation to-day trembling under the impact of shocks emanating from the East. We can well understand, therefore, how it is that there are those who believe that the focus of civilisation is destined to undergo another shift, and that the day of the predominance of North-Western Europe is drawing to a close.

The subject is not one which can be discussed here. But if I may sum up briefly the points I have been trying to make, I would say that the human geographer should have before him a twofold purpose. In the first place he should strive to show that the deductions which the biologists have slowly and painfully laid down in the course of the last sixty years apply, though with an essential difference—which requires careful definition—to the life of man. Second, he should use his precise knowledge of the surface of the earth to work out detailed applications of those deductions. In other words, human geography is the biology of man, and, on account of man's vast power of modifying his environment, necessitates a fuller knowledge of that environment than can be required of the biologist in the narrower sense. Investigations along these lines would, I think, promote greatly the interests of geography as a whole, both by making clear to the general public its value and in justifying that intensive study of the surface relief and the associated phenomena which must always remain its basis.

SOME GEOGRAPHICAL FACTORS IN THE GROWTH OF THE STATE.[1]

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One of the greatest of modern geographers, the late Professor Ratzel, summed up much of his study of political geography in the statement

[1] A Lecture delivered before the Society in Edinburgh on February 16, 1922.

that every State consists essentially of land and human beings, a territory and a people.[1] Later Professor Brunhes, fresh from the study of irrigated areas, amplified this assertion by emphasising the vital need of water and the welding together of the land and the people.[2] It seems to me that there is a third essential component of the state not explicitly mentioned in either of the statements referred to, though its recognition is fully implicit in the works of both these eminent geographers. This third requisite is organisation. And, adding this, we may say that from the view-point of the geographer the state consists essentially of a habitable land occupied by an organised people; or, in a concise formula,

State = Habitable Land + Organised People.

It is, of course, self-evident that no state can exist apart from some territory which is under its direct control and supplies the material basis of its life; hence its whole life and development are in part determined and in part strongly influenced by the nature and extent of its territory. From this it follows that geographical facts are of prime importance in the growth of any state, and that it is quite impossible to obtain a correct view of its development and its relative importance without a study of its geography. The factors influencing the habitability of the land have often been dealt with in geographical studies; here we shall be more concerned with those which affect the organisation of the people — the second item in our definition of the state.

Few facts of the geographical environment influence only one of these two main aspects of the state; the fertility of soil which favours the growth of a dense population thereby tends to increase the amount of intercourse among the people, by bringing them nearer to each other, and by making it easier to construct artificial means of communication, and so favours a closer organisation. Nevertheless, it is convenient in the study of political geography to arrange these facts in two main groups corresponding to the two essentials, of habitability and facilities for organisation, stated in our formula. In the first group we place such facts as the location and extent of the land, and the kind, amount, and availability of the natural resources which it affords for the maintenance and well-being of its people. In the second group are its position in relation to other lands, the nature of the frontiers by which it is enclosed, the character of its natural routes and the extent to which these routes converge on some principal nodal district, or the lack of such a focus, together with the conditions which affect the construction of artificial ways; since the ways of communication are the geographical factors which most directly influence the organisation of the state.

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[1] 'Land und Leute' or 'Staat, Boden und Menschheit.' F. von Ratzel, *Politische Geographie*.

[2] 'L'État, [illegible] humaine, est l'amalgame d'un peu d'humanité, [illegible] de sol.' J. Brunhes, *La Géographie Humaine*.

[3] [illegible] to the [illegible] posthumous paper by Professor Herbertson, 'Regional Geography, Heredity, and Environment,' in the *Geographical Teacher*, [illegible] 1913.

The position of a country on the earth's surface is the prime geographical fact concerning it. This location is the chief determinant of its climate, and hence of its vegetation ; and the character and abundance of the vegetation determines the food-supply, except in a very few instances, and so the chief of the natural resources on which the life of the people depends and by which a large part of their work is determined. The natural vegetation also, according as it varies from dense forest to open grass or scrub, influences very directly the ease of movement about the country, and so the organisation of the people, especially in early stages of social and political development. The earliest states of which we have any historical records all grew up on open areas : not until civilisation was well advanced was man able to clear a thick forest and so to establish organised communities on lands which are naturally forest-covered. The appearance of civilised states was much later in Europe north of the Alps than in the Mediterranean Region, largely because the former was mainly a forested region while much of the latter is open country.

The direct relation of the extent and fertility of the habitable land to the numbers and wealth of the people at any given stage of culture, and so to the possibilities of state development, is too obvious to need discussion at this stage. But it is worth while to note here that the possession of a territory of moderate extent, marked off from other lands by definite barrier frontiers, was a great advantage to many states in their formative periods. This fact is amply illustrated in the growth of several of the national states of Europe. Effective organisation can be attained much more easily over territories of moderate size than over vast areas where sheer distance is in itself a serious hindrance to prompt and frequent communications—as in Russia, where the slow rate of development for many centuries was in part due directly to the enormous distances to be traversed. Throughout almost the whole of the ages during which the present states of Europe were in process of formation horse travel, without any good roads, was the most rapid means of communication ; and in consequence the maximum radius for effective political organisation seems to have been rather under than over two hundred miles from the metropolitan area which was the centre of authority. Districts more remote were rarely fully incorporated in the state, and so were not real additions to its strength except in so far as they served to secure its borders, as Durham and the Border Marches did for England.

But geographical factors can only be studied satisfactorily in relation to particular countries ; therefore we must bring these general statements into relation with particular cases and consider the growth of some few individual states. It may be doubted whether any barbarous power, such as that of the Zulus or of Ashanti, under their native rulers, ever reached a degree of organisation which would justify us in terming it a state, except in a very primitive form. Hence we shall limit this paper to countries which were at least semi-civilised.

Ancient Egypt was one of the earliest definite states of which we have

any knowledge, and we may well glance very briefly at some of the conditions of communication in that country. Its habitable land consists of a narrow longitudinal strip threaded by the Nile, and the triangular area of the delta. The river provides a good highway to all parts of the country, and by its division at the head of the delta fixes there a principal node of the routes and so the metropolitan area. Here the conditions were highly favourable for the organisation of the people into one state, more so than in almost any other part of the earth. The chief approach to unfavourable conditions lay in the distance from end to end of the country. The lower Nile, from the sea to the first cataract, is some seven hundred miles long; and this great distance prevented complete unity. The union of Upper and Lower Egypt, the Valley and the Delta, symbolised by the double crown of the Pharaohs, was liable to fail in times of stress and weak government. Egypt is, however, a very special case in geographical study because of the unique simplicity of the physical environment. It is better to consider countries which are less markedly unique; and we shall pass to a consideration of some of the various states which have occupied parts of this island of Great Britain since the dark age which followed the break-up of the Roman Empire.

The surface of the English Lowland during the Anglo-Saxon period, from the fifth to the eleventh centuries of our era, was cut up by barrier areas of dense forest and marsh into several distinct regions, within each of which continuous settlement was possible. And, after a period of scattered conquest and settlement by many comparatively small bands of the invaders, of the details of which we have very little record, there emerged a group of kingdoms each of which was based on one or more of these regions, with for the most part indefinite limits in the barriers. Of these kingdoms the most isolated was Sussex, based on the open land of the South Downs and the coastal plain at their foot, bounded on the north by the Weald forest, east and west by marshland, and southward by a smooth coast with no considerable inlets. It was a natural result of this greater isolation that Sussex was the last of these states to accept Christianity. It occupied a small area, some sixty miles long by less than twenty wide. Every part of it was easily reached from any point in it; and therefore it was easily organised and held together by horse and foot communications; and it had neither opportunity nor temptation for expansion. The relative isolation of Sussex lasted into the railway age, and in our own days Kipling could write of the region that

> "... in her secret heart
> The heathen kingdom Wilfrid found
> Dreams, as she dwells, apart."[1]

Sussex illustrates very well the advantages, for the early stages of state development, of a small, compact, and easily organised territory marked off by strong barriers.

[1] Rudyard Kipling's Verse, 1921 edition, p. 245.

The kingdom of Kent was marked off in similar fashion to Sussex, which it resembled in size and surface features ; but it differed in two important respects. First, Kent is on the most direct route between Britain and the Continent and its effective territory is a highway, so that it was never isolated like Sussex. It was the first of these states to accept Christianity. Second, Kent has had throughout its history two rival town centres, similarly placed at river crossings on its highway and at the northern end of gaps in the Downs. These are Canterbury and Rochester, the capitals of the Men of Kent and the Kentish Men respectively, and of the two bishoprics into which Kent was divided from very early times. The two sections are not separated by any barrier or change of surface conditions, but solely by being focussed on different towns. The eastern town was traditionally the chief because of its nearness to the Continent and continental influences.

At least two other minor kingdoms, East Anglia and Essex, shared with Kent and Sussex that south-eastern section of the Lowland which was marked off from the interior mainly by the Fenland, the forests of Hertfordshire, and the Weald. There is some uncertainty as to what were the factors which prevented a spread of the conquest inland by the line of the Thames. The marshes and forest to the north of London probably played some part ; and it is probable that London itself was able to check advance up the river in the earlier stages of the invasions.[1] It is clear, however, that the conquest of the main part of the island was not made from the south-east but from the south coast and the east coast from the Wash northwards. By the middle of the seventh century the greater part of the Lowland of the island was occupied by three large kingdoms, Wessex, Mercia, and Northumbria, in the south, centre, and north respectively. Let us consider the geographical conditions for the organisation of each of these and of the struggle among them.

Wessex began as a group of settlements in the Hampshire Basin, of which Southampton (Hamtun) seems to have been the chief. These settlements, grouped round the sheltered waters behind the Isle of Wight, were within easy reach of the open country of the chalk downs, which approach within six or seven miles of Southampton. And the most attractive soils were almost certainly the fertile and easily cultivated chalk marls at the foot of the Downs, where the chalk subsoil would check dense forest growth. Hence the settlers spread inland ; and so found themselves on the chief area of open land in Britain, and in contact and conflict with the native peoples. The result of their ultimate victory in this contest was the expansion of Wessex to include all the open country in this part of England ; and an important effect of the continuity of this open downland, together with the exposure to the

[1] Cf. Sir H. J. Mackinder, *Britain and the British Seas*, 2nd ed., 1908, pp. 198-199 and 253; Sir J. G. Broadbank, *History of the Port of London*, 1921, vol. i. pp. 12-15; Sir G. L. Gomme's *London*, and the Rev. P. H. Ditchfield, *The City of London*, 1821.

energy resulting from the absence of barriers, was the consolidation of all the territories united into one state.

The northern kingdom of Northumbria occupied the east coast for some two hundred miles from the Humber to the Forth, with varying limits to the westward. As a settled area it was very much broken up by a number of Highlands which approach the coast, and it had thus four main divisions, namely:

1. In the south the Lowland drained by the Yorkshire Ouse and the Tees;
2. In the centre the coastal plain extending from the low, but relatively barren, East Durham plateau to the Cheviot Gate: and
3. In the north the two smaller Lowlands of
4. The Merse, and
5. The Lothians.

Of these divisions the first is the most extensive and fertile, and thus its chief town of York was the capital for the latter part of the separate existence of this kingdom. This fixed the capital in the southern end of the kingdom, and the northern sections were comparatively remote from York, only accessible by a difficult land journey, or by sea, so that when the Viking raids made the sea-route unsafe they tended to fall away. Also the Lothians are a part of the Scottish Lowland; and when the progress of settlement and civilisation gave rise to states in what is now Scotland, this became a debatable land which finally fell to the nearer northern power. West of the Pennines there was no fertile area which could support a serious rival to the kingdom based on the fertile Vale of York; and so Northumbria reached to the west coast through the Aire Gap and over Stainmoor Pass, and also by the more distant line of the Tyne Gap to the Solway Lowland. But of these western districts the southern was more accessible from Mercia through the Midland Gate and the northern was equally accessible from Strathclyde; hence only the central areas were long attached to York.

Mercia included most of what is now the English Midlands. This is the most fertile part of Britain, and it was in later times also the most populous. But it contains only a small proportion of the chalk and limestone areas which are naturally open country, and in the Anglo-Saxon period the area actually available for cultivation was very much reduced by stretches of forest and marsh. Mercia was also the Middle Kingdom, and had exposed frontiers on all sides; but the greatest disadvantage under which it laboured was the lack of any principal nodal town as a focus for the organisation of the state. Its more important towns included Lichfield and Nottingham to the north, Leicester and Northampton to the east, Worcester to the west, and Coventry nearer the centre; but no one of these was much more important than the others as a node of the routes. The waterways of the area scatter to five separate destinations in the Irish Sea, the Bristol

Channel, the Thames, the Wash, and the Humber, without radiating from one central district. The older roads crossed Mercia diagonally, and from north to south, without forming any principal node within its area and without touching some of its more important towns.[1] With such communications Mercia could have no nodal capital comparable to York or Winchester; it was still in the low stage of political development marked by the absence of a definite capital, and was probably even less firmly consolidated than its rivals.

These states were all at too primitive a stage of social and political development to be able to endure close contact. The conception of a definite boundary line was not fully developed; and even if it had been they had no administrative system capable of enforcing respect for such a line on the people, or of policing a boundary. Except for short periods, under very vigorous rulers, the means of maintaining order were insufficient for such a task. Hence actual contact of the peoples of two states involved constant friction. The only effective boundary was a barrier sufficiently wide and difficult to prevent easy intercourse. But the progress of the clearing of the forests and the settlement and cultivation of the land which were going on, probably with many local interruptions, during these centuries was gradually destroying the chief barriers between these states. And since, in the absence of the barriers, the English Lowland is too small to give room for more than one state, a struggle for supremacy was inevitable.

For this struggle the three principal kingdoms seem to have been fairly evenly matched in extent and resources. Wessex had the advantages of the most compact effective area and the best facilities for the organisation of its resources in the ease of movement over the downland; and it was probably more firmly consolidated than the others. Also it was nearer to the Continent and so more exposed to the stimulus of intercourse with more civilised peoples. Its chief disadvantage lay in the less fertility of most of its territory; but this was not of great importance so long as large parts of the Midlands were still uncleared. What the result would have been had the contest been fought out without interruption we cannot know. The issue was actually decided by foreign intervention.

In the ninth century the storm of the Viking Period burst over Britain, and the nearer parts of the island were overrun. In the north the Norsemen obtained command of the Isles and parts of northern and western Scotland. In the south the Danes made a temporary conquest of a large part of eastern England, stretching from the Thames to the Tees and inland to the middle of the island. This conquest effectually broke the power of both Northumbria and Mercia; but most of its force was spent there; and it left Wessex, invaded and ravaged indeed but substantially whole, to head the reconquest of the Danelaw in the next century, and in doing so to secure hegemony in the southern half of Britain.

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[1] Cf. map in T. Codrington's *Roman Roads in Britain*, 3rd ed., London, 1918.

The capital city of Winchester was a very convenient centre for the life and organisation of Wessex so long as that state was based mainly on the lands round the Hampshire Basin. But for the English Lowland as a whole London is unquestionably the dominant node of the natural routes after the clearing of the forest had opened the valley ways; therefore London was by far the best centre for the organisation of an English state. Hence the transfer of the capital to London was a great step toward the unification of England, though the political unity was incomplete until the period of Norman rule.

The most important of the minor regions in which there could develop a power dangerous to the newly established kingdom of England was Yorkshire. This is the northern end of the Lowland, partly cut off by the Humber and the Humberhead marshes, separated from London by a distance of nearly two hundred miles, and, at that time, very definitely focussed on its own central city of York. It is evidence of the real political insight of William I. that he seized the first opportunity to subdue Yorkshire, and carried out the subjection with a savage thoroughness not shown in less important conquests. It is significant of the influence of mere distance that some centuries after the effective conquest of Yorkshire it was again for a time outside the general political system of the country under the jurisdiction of the Council of the North; and that a similar separate organisation was also set up for Wales and its Marches. The justification for these Councils was the difficulty of governing efficiently at such a distance with the contemporary means of communication. The arm of the law can only reach as far as the means of communication allow; and not until the improvements in means of travel of the seventeenth and eighteenth centuries did these distant areas become really incorporated in England.

In its earliest stages the political development of Scotland was akin to that of England. It was too far from the centres of organisation on the English Lowland to be incorporated in any of the states which developed there; though Northumbria was as much a part of Scotland as of England before its capital settled down at York, perhaps more so in that it was first civilised and Christianised by northern influence. And England had long been a united country before there was any attempt to include Scotland. But the geography of Scotland differs in many respects from that of England; and hence the course of political developments in the two countries differed greatly, in spite of the close kinship in race, in language, and in civilisation. The Scottish Lowland has a less favourable climate and is also smaller and more broken up into sub-regions than the English Lowland; and it had no nodal town in a dominant position. In the latter respect it resembled Mercia in possessing several towns of comparatively equal nodality and importance, no one of which could dominate the whole area. Glasgow, Stirling, Perth, and Edinburgh were too nearly equal. Also the Scottish Lowlands were overshadowed by the Highlands to an extent which greatly hindered their development. In South Britain the English Lowland had so great

a preponderance in area and resources over the Welsh Highland that the latter was never a serious danger to the English state. But in the north the Highlands are much more extensive than the Lowlands, and the resources of the latter were not so much the greater as to give their people a decisive superiority ; so that the struggle between the more civilised Lowlanders and the less civilised Highlanders was not finally decided until after the Union. The political unification of Lowland Scotland was mainly due to the attempt at conquest made by Edward I. of England—and its failure—though it was not consolidated till two or three centuries later, as a political by-product of the religious and social changes of the Reformation. The still more recent unification of Lowlanders and Highlanders in one nation is to be ascribed chiefly to the rise of Glasgow to the position of a dominant economic focus for the whole country, and the simultaneous improvement in means of communication.[1]

In continental Europe the nearest parallel to the very favourable geographical conditions, for political and national development, of the English Lowland is to be found in the Paris Basin. The French region is a little larger than the English ; but it has the natural ways formed by its converging valleys focussed to an even greater extent on a dominant nodal centre, in which its chief city of Paris grew up after the progress of forest-clearing had opened the valley ways. Paris is more central in its region than is London, and could thus serve as an effective centre of organisation for the whole. In each region the maximum distance from the capital to the marginal districts is about two hundred miles. But the resemblance between the English Lowland and the Paris Basin is confined to their internal features : their external relations differ widely. England is fully isolated from any other region of comparable resources and had no possible rivals in Britain. The Paris Basin is not cut off by any strong barriers, and has direct contact by easy routes with neighbouring regions which could, and did, develop rival powers. The chief of these were (1) Aquitaine to the south-west beyond the Gate of Poitou ; (2) Burgundy to the south-east across the open upland of the Côte d'Or ; and (3) the lowland of Flanders to the north beyond the chalk downs of Artois and Picardy ; while behind the last two, but near enough to be of great importance, was the Rhineland. The history of the development of France is largely that of the struggle for the unification of the Paris Basin and for the incorporation of these other outlying districts with the central region of the state.

France as a whole is comparable in extent with the British Isles rather than with England ; and we may note that although for the principal nuclear region of each, the English Lowland and the Paris Basin, England had the more favourable geographical conditions and was the

[1] This unification was discussed more fully by Dr. Newbigin in "Race and Nationality" in the *Geographical Journal*, November 1917.

first to reach political and national unity, yet the secondary regions, such as North England, Wales and its Borders, the Scottish Lowland, the Scottish Highlands, and lastly the Irish provinces in Britain were less [illegible] from the capital than the corresponding regions of Burgundy, Picardy, Aquitaine, Brittany, and Provence in France; and the effective unity of Britain was attained later than that of France. In fact, most of Ireland has never been fully absorbed into the British state. Two important factors in this difference of development were, first, the very eccentric position of London in Britain, which lessened its influence on the northern and western regions, and second, the continual pressure of external powers on France, which resulted from its continental location and had no parallel in our country.

The political development of the German lands of Central Europe was greatly retarded in comparison with that of France and Britain, largely because of three important geographical conditions, namely :—

1. The lack of any principal continuous fertile area capable of nourishing a strong state which could form a nucleus for the whole.
2. The absence of any focus of the natural routes which could give rise to a city comparable in influence to Paris or London
3. The greater extent, and the absence of definite barrier frontiers except to the south.

There are several regions capable of forming bases for second-rank political units, such as Bavaria and Franconia, Saxony and Bohemia, each with one or more nodal cities; but none of them was sufficiently isolated to develop freely, as England did after its unification, or sufficiently powerful to unify the whole of Germany, as the Paris region was able to do for France. Not until late in the medieval period, when these western states were already well developed, did the progress of clearing and cultivating the difficult land of the North German Plain make it possible for Brandenburg-Prussia to become the nucleus of a powerful German state; and the actual political unification was not attained till the nineteenth century.

The most interesting, from our point of view, of the natural regions of the old German Lands is the lower Rhineland. This is the Lowland extending along the North Sea coastal plain from the Picard Heights to the heaths of Oldenburg and inland to the Ardennes and the Rhine Highlands. This region includes Aachen, which was in some degree a capital of the Empire of Charlemagne; but it has never been under one rule since the Partition of Verdun (A.D. 843), though the whole of it was for some centuries accounted part of the Holy Roman Empire. It would seem to be the one region which could form a favourable geographical base for a state strong enough to be a nucleus for the unification of the lands of the Empire; but during the Middle Ages any political unification was made impossible by the existence in it of a number of ecclesiastical states, such as the Bishopries of Liége and

Münster.[1] In the fifteenth century the Dukes of Burgundy came near to establishing a powerful state here; and in the seventeenth, after the Reformation had weakened the ecclesiastical states, the Dutch might possibly have done so, though the nearness of other powers hindered any such development after France and Prussia had become strong states.

This rapid sketch of some of the geographical factors in the development of these few states may enable us to state some of the influences in more general terms, at least tentatively, in conclusion.

The area and natural resources of the territory of a state are of fundamental importance in relation to the numbers and prosperity of its people and so to its strength; but only that area which is capable of being fully incorporated is a real addition to the state. In the ages when horse and foot travel were the only means of communication on land, and navigation was still insufficiently developed to provide secure and rapid sea-communications, an essential condition for state development was the possession of a continuous and compact territory all of which was within reach of its capital; so that only comparatively small states could be firmly consolidated. Two other conditions were almost equally vital: first, that all important sections of this territory should be accessible from the capital by fairly easy natural ways or, in other words, that the capital should be a principal node of routes for the territory of the state; and second, that its frontiers should be strong enough to preserve its marginal districts from the influence of any rival state of approximately equal, or greater, strength and attracting power. Where these conditions were not satisfied there was no enduring political stability.

The importance of the focal capital is a direct result of that of communications; and here modern developments have enormously increased the radius of the sphere of influence of the great city, and so modified that of many nodal towns. Railways and artificial waterways have made Berlin an effective capital for Germany; though it has little of the traditional importance of Paris or London. In some countries modern industrial developments, with their accompanying concentrations of population and routes, have produced great nodal cities which are now serious rivals to the older capitals based on past conditions. Paris is still the unrivalled capital of France. But in Germany Berlin and Hamburg have outgrown the medieval foci of Frankfort, Cologne, and Dresden. In Italy Milan is now, in all but traditional values, of more importance than Rome. Even in Britain Glasgow has outgrown Edinburgh; and London is no longer the chief centre of population, since the rise of the industrial districts of mid-Britain has given that status to Manchester.

The importance of area is also directly related to that of communications. Under medieval conditions the English Lowland seems to have been a near approach to the maximum area capable of real unification.

[1] Cf. maps such as Plates 35 and 36 of Lane Poole's *Historical Atlas of Modern Europe*, Oxford, 1902.

The political organisation of Great Britain and of France was attained only in the seventeenth and eighteenth centuries as a result of improvements in rural communications, which increased the radius of effective organisation. That of territories as vast as Russia and the United States was not achieved until the coming of the railway; since when a number of large states have developed. At the present day the limitation of distance has, for some political purposes, almost vanished: and therefore great extent of territory, if associated with unity of the people, is now an addition to the strength of a state. This is so much the case that the day when a small state could be a "Great Power" is gone. States of small area and resources and population can only play a great part in the future as members of larger groups: and a world federation is now a possibility, in so far as material means of communication are essential to it.

AGRICULTURE AND POPULATION IN GALLOWAY.[1]

By William A. Gauld.

(With Illustrations and Diagram.)

By this already been shown how Galloway forms a region with a number of natural units based primarily on physical characteristics. These divisions have a further geographic value, as we shall see, in that they represent distinct units of human activity.

On the physical side the natural units are not clearly defined, but merge into each other through areas of transition, and in the same way there is a gradation from one type of human life to another. The units however provide a very useful and, on the whole, accurate framework in which to set the facts of the human as well as the physical geography of the Province.

For the sake of convenience, we may here briefly restate these natural units. In Wigtown there are three: (*a*) "the Moors," the central area at the western end of the Galloway moors; (*b*) "the Machers," the peninsular portion south of a line joining Newton Stewart and Glenluce; (*c*) "the Rhinns," the western peninsula and the Stranraer plain. In Kirkcudbright the units are less well defined. They are: (1) the north-west group—(*a*) the High Moors of Merrick-Kells, (*b*) the "Glenkens" valley, and (*c*) the Low Moors; (2) the south-east group—(*a*) the Southern Moors and coast belt, (*b*) the central belt. This group can be called the East Galloway Lowlands.

An analysis of the agricultural statistics of Galloway brings out the importance of the natural unit as an essentially physical division in this region. The figures for 1913, a good average year, are calculated out on a percentage basis from parish statistics (kindly provided by the Board of Agriculture for Scotland), and are as follows:—

[1] See *S. G. M.*, Jan. 1922, p. 22.

Natural Unit.	Percentage of Cultivated Acreage in				
	Rotation Grass.	Permanent Grass.	Oats.	Turnips.	Other Roots.
WIGTOWN.					
"The Moors" . . .	30·9	43·4	16·4	7·4	1·1
"The Machers" . .	38·3	36·3	15·9	7·3	0·75
"The Rhinns" . . .	43·8	19·15	23·9	11·2	1·1
KIRKCUDBRIGHT.					
"The Glenkens" . .	13·45	74·0	7·2	3·2	1·5
High Moors (Minnigaff) .	22·2	62·0	11·1	3·8	0·6
Low Moors (west) . .	18·5	66·5	9·3	4·5	0·8
„ „ (central) . .	26·3	53·1	12·4	6·1	2·0
„ „ (east) . .	27·5	51·0	13·6	6·0	1·8
East Galloway Lowlands :—					
(central) . . .	29·4	51·2	12·3	5·9	0·8
(coast belt) . . .	34·4	35·6	19·3	7·0	3·6

(*Note.*—The totals are deficient because of other minor crops and small calculation errors.)

The main points brought out in this table are :—

1. The larger percentages of grain and root crops in the western county. These arise from the greater physical uniformity of the west as compared with eastern Galloway, and also from its lower elevation and lesser rainfall.

FIG. 1.—Region of high moors with hills of Minnigaff. "Deil's Dyke" in foreground.

2. "The Rhins" unit is pre-eminent in agriculture, while the contrast between "the Moors" and "the Machers" is less marked than might be expected because several parishes share in both hill and plain zones. Thus in New Luce, a moorland parish in the main, the acreage of cultivated land is much less than the percentage figures for "the Moors" unit suggest.

3. In Kirkcudbright, the parish of Minnigaff includes most of the high moors of the north-west, but a portion of this country is included in the parishes of "the Glenkens," and modifies the figures of this unit. Minnigaff itself includes a large part of the eastern side of the fertile Cree valley, and this has given it fairly high percentages.

4. The division of the Low Moors unit into three zones serves to illustrate how agriculture tends to improve eastwards away from the rainfall maxima.

5. The central belt has the highest percentage of cultivated land in the eastern county (82 per cent.); it has more rich meadow land and its agriculture is more specialised than that of the coast belt.

6. The Criffel-Screel moors divide the coast belt from the central belt, and in consequence the former has developed a more mixed form of husbandry which enables it to be in some degree self-supporting.

The figures also throw a considerable light on the distribution of the existing forms of agriculture.

Present Day Agriculture.

In Galloway four main types of husbandry may be said to occur. The cattle industry, with a long tradition behind it, has two main branches, (*a*) the dairy-farming industry, and (*b*) the stock-farming industry. The Ayrshire cow, introduced in the period 1850-70, is the typical dairy breed, and is found in largest numbers in Wigtown as a whole and the central and coast belts of the neighbouring Stewartry. The stock farming of "Galloways" and other breeds occurs on the rich alluvial grasslands and on some of the richer hill pastures. Then (*c*) there is the hill pasture and lower moorland sheep-farming industry, which occupies the hill populations of both counties but is best developed between the Cree and Nith waters. Finally (*d*) there is the arable farming of both counties, which is closely related to the cattle industries.

The provincial farms fall naturally into two groups: (1) the arable farms which tend to specialise in dairy or stock cattle, in addition to the necessary farm cultivation; and (2) the hill or stock farms, which are mainly grass or sheep walks. The arable farms average from 60 to 600 acres, and are rented from £80 to £700 a year, while the hill and stock farms are larger and are rented from £200 to £1000 on the basis of the stock which they can hold rather than on the acreage.[1] Within recent years the progress of the dairy farming industry has been furthered by the establishment of creameries in the main dairy cattle areas, notably in

[1] Kirkcudbright and Wigtown, W. Learmonth (Cambridge series).

Wigtown. These are located along the main lines of communication, and a motor transport system enables them to capture the supplies over a large area. A pig-rearing industry has been created as a result of the butter and margarine manufacture of the creameries, and the waste products are thus utilised with profit. Areas situated far from the centres where milk is required, *e.g.* the Southern Rhinns and Machers, specialise in the cheese industry, and the output goes very largely to Glasgow and other Scottish towns. The cheese farms all have their attached piggeries, the "whey" residue providing the feed.

The rearing of native "Galloways" is an old-established industry and was probably at its height in the "droving" days of the eighteenth century: its survival is mainly due to the formation of the Galloway Cattle Society in 1877 for the maintenance of the breed. The polled character of the Galloways is a comparatively recent feature; in the middle of the eighteenth century the Galloways which appeared in the English markets were nearly all horned animals, and the original connection with the primitive west coast "Celtic" type of ox (*Bos longifrons*) seems definitely established.

The Galloway sheep are at the present time in the main a mutton stock. The black-faced breed is probably the oldest; the tendency nowadays is to rear Cheviots for wool and Leicesters for stock purposes in the agrarian belt, and the black-faced sheep are being more and more driven into the moors. The sheep farms are located in the hill pasture zone, and the moorland zone is sometimes invaded up to 1500 feet and even higher in the grass-topped hills. Within the last few years the hill sheep have been suffering very considerably from the spread of the diseases known as "braxy" and "loupin-ill." It has been suggested[1] that climatic "predisposing secondary factors" are largely responsible for these. In the case of braxy the consumption by sheep of succulent food, *e.g.* grass or turnip shaws, covered with hoar frost, is believed to be a potent factor in the development of the disease. It is in the lower portions of the hill valleys that frost conditions tend to be prevalent, and it is among the sheep feeding on the alluvial holms of such valleys that braxy is most common.

The "loupin-ill" disease is said to be due to the rapid climatic change often experienced by sheep moving from winter to summer pastures. The vertical movement is not nearly so common as it was years ago, and the construction of hill shelters has done away in part at any rate with the necessity of finding winter feeding in the lowlands. The survival of the tradition of summer and winter pastures is perhaps preserved in what is known locally as "the Term." Term-time in Galloway occurs at Whitsunday and Martinmas (May and November), and at these seasons it is customary for any changes in house possession to be made. While this is no doubt largely a matter of convenience, it

[1] *Trans. High. and Agric. Soc.*, 1920: "The Relation of Climate and other Secondary Factors in certain Diseases in Animals," M'Gowan.

is very interesting to find a coincidence in time with the changes in pasture.

A word may be said as to the location of the farms themselves. In the Rhinns, farm property is usually situated on rock outcrops and high land, and this is also true of the Southern Machers. In the Rhinns again, more farms are located along the sheltered Loch Ryan and Luce Bay coast than on the exposed west coast, where there is scarcely any beach line and such farms as there are lie in sheltered valleys. In the Stranraer plain the farms still occupy the higher ground, but are more scattered; the farms of Garrie and Craigencrosh, for example, are surrounded by the 100-feet contour.

Fig. 2.—Esker at Knockbrex, Newton Stewart.
The eskers form the most suitable areas for farm crops owing to the good drainage.

The farms of the Machers are more abundant on the east side of the peninsula and reclamation has proceeded inland from the coastal belt. The question of water supply was of primary importance in the siting of farms. In the Machers the relation of the spring line to the farms is illustrated in the case of the Whithorn area, where springs emerge for the most part in the neighbourhood of the 100-200-feet contours along parallel lines in the direction of the rock strike. This parallelism is seen in the location of the farms Tonderghie, High Arrow, and Arrow on one spring line, Cuteloy and Drummoral on another. In size the Machers farms compare favourably with those in the Rhinns, but there is a greater proportion of small farms due to the variation in soil types in the former, while the Rhinns is more uniform in character.

In the Moors are croft farms tenanted by herds, but the normal arable farms extend along the river routes into Ayrshire. In Minnigaff the mixed farms are restricted to the lower part of the Cree valley and its tributaries the Penkill and Palnure, together with the old valley line occupied by the road from Newton Stewart to New Galloway. In the Glenkens all four forms of husbandry occur, but the arable dairy and much of the stock-cattle farming is located in the valley itself, while the hill pasture and moorland background is given over to sheep farms ; this is the herding country *par excellence*. Many of the arable farms in the main valley have their attached hill farms on the adjoining moors.

The question of water supply in the higher grounds where wells only reach the upper levels of saturation is a serious one. In the drier spells water has to be carted or is stored during the wet season in tanks. In the lower levels where there is a wide distribution of boulder clay, *e.g.* in the vicinity of Balmaclellan, the farms are situated on driftless surfaces and in the vicinity of the spring line at the junction of the boulder clay and the driftless area. In the Low Moors the combination type of sheep and arable farm occurs, while in the central belt the farms are richer and have larger outhouses. The "home" farms of estates as a rule are the best equipped farms, having been capitalised by the estate owners. In the coastal fringe of the south-east, the mixed farms of the carboniferous belt give place to sheep farms in the moors behind. The stone used in farm construction is mainly the "whinstone" or greywacké of the Silurian country, while granite is used to some extent for the dwelling-houses, which are always detached in the larger farms. Proximity to the railway sometimes enables the fine New Red building stone of Locharbriggs in Nithsdale to be used for the dwelling-houses. Until the end of the nineteenth century, when Welsh slates began to be brought by rail, the grey and blue flaggy shales of the Silurian formation were largely worked for roofing purposes ; they were too thick and heavy, however, requiring strong timber rafting, and before the advent of the modern slate the "thatch" roof was generally preferred.

The Relations of Agriculture and Population.

As agriculture in its various forms is the basis of life in Galloway, the distribution of population follows very largely on the distribution of farming lands. Just as in present-day Galloway the differences in population have resulted mainly from the nature of agrarian industries in the Province, so it was throughout its history. The permanency of regional variety is brought out by a survey of the agricultural changes and the related growth and decline of population.

Prior to the eighteenth and nineteenth centuries, when population returns enable a more exact comparison of agricultural influences, the croft system of farming with the "infield" and "outfield" seems to have existed.[1] The cropping was bad and exhausting, and the yield

[1] H. Graham, *Social Life in Scotland in the Eighteenth Century.*

poor. The universal "runrig" system was a serious obstacle, but [illegible] "rigs" or "lots," remnants of which may still be seen in some cultivated fields of the Glenkens parishes and elsewhere, [illegible] survival till a recent date of the individual tenantries based on [illegible] and the rights of common pasture are still held to in the hill country. The cattle industry was hampered by the lack of winter straw, [illegible] necessitated cattle renters selling out in the autumn. Again, the marks of ancient furrows on hillsides in Galloway as elsewhere in Scotland [illegible] as has been supposed, the indications of a prosperous agriculture, when the cultivated zone went much higher than to-day. As Graham says, "the marginal signs of an energetic husbandry were evidence of the wretched want of cultivation, telling of an undrained soil, of deep wide morasses filled with rushes and inhabited by lapwings, which had forced the poor husbandmen in their despair to this high farming, in the only dry spaces they could find, which ill requited seed-time and labour." It was the difficulty of drainage in the expanses of peat bog in the lower areas which so greatly hindered the small farmer, and the general superiority for arable purposes of the lower hills over the valleys between still remains a very real fact.

The general unsettled character of the medieval period in the Borderlands, and the absence of scientific agricultural method, prevented any considerable population growing in the Province, and it was not until the eighteenth century that development really began. The Union in 1707 caused an immediate change in the agricultural system.[1] It opened up an unrestricted market for lean cattle in England, and the Scottish gentry at once turned their lands to this profitable industry. Grass, hitherto regarded merely as fallow to enable lands afterwards to produce oat crops, now became valuable on its own account. The immediate result was an increase of the grass acreage at the expense of cultivation. The restriction in tillage, the ejection of tenants from farms given over to pasture or joined into larger ones, together with the enclosures for the purpose of stocking black cattle from Carrick at the expense of the common pastures, led to the Leveller Rising of 1724—the Peasants' Revolt of Scotland. This put a check on enclosures, but not for long, and by 1747 a regular droving industry had been established. From that time until the middle of the following century, lean cattle were sent to the Norfolk markets for fattening before the London sales.

In the meantime, progress was being made in cultivation methods. Local societies were formed for improvement, and the use of shell marl and later of lime was leading to more intensive production from the soil. The Turnpike Road Act of 1751 began the era of modern roads, and wheeled traffic replaced that of the older "packroad." In spite of the general increase throughout Scotland in crop output, Galloway still remained a pastoral country. The pre-eminence of cattle in the south-west is commented on by Wight in his *Husbandry of Scotland*, 1784, where

[1] Gregor, *The Agriculture of Kirkcudbrightshire and Wigtownshire*, 1873; Rev. S. [illegible], *General View of the Agriculture of Galloway*, 1810.

he remarks, "The bent of the people has always been to horned cattle, and they totally neglect sheep, for what reason I cannot understand," and he adds later, "Galloway is the country in Scotland the best fitted for sheep." Heron in his *Tour* of 1793 mentions improvements in agriculture "to provide for the feeding and fattening of black cattle." It is probable, however, that Wight is referring rather to Wigtown and Carrick, and that the sheep industry was still prominent in the Stewartry, for the tradition of Galloway wool had long been established. The first half of the nineteenth century was to witness the rise of industrialism in the Midland valley of Scotland, and no doubt a considerable exodus of population resulted from the new occupations offered. Following on the increased road transport facilities of the coaching period of 1800-1830 came the opening of sea communication between Liverpool and Galloway ports in 1834. This, together with increased use of turnips in winter, allowed of home-fed fat stock being sent direct to the Liverpool market, and the lean cattle droving industry began to decline. But a great change was at hand. The period of 1840-50 had brought a great development of dairy farming, and the Ayrshire cattle began to penetrate Galloway just as at an earlier date the "Carrick" or "Galloway" stock had done. In the period 1850-70 there was a general change from a store and breeding cattle industry to dairy farming, which was most conspicuous in the western county, and the sheep industry increased by 50 per cent. The general depression in agrarian Britain of 1851-53, following the repeal of the Corn Laws, did not greatly affect the pastoral regions, and the double decade of 1850-70 was in fact a halcyon period for agriculture in the Province.

The construction of the railway between Dumfries and Portpatrick (1858-62) permitted of the transport of live stock by rail, and also increased the mobility of the population, which tended more than ever to vacate the isolated and difficult regions.

After 1870 the influence of foreign competition became steadily more pronounced, and with it an increase in pastoral farming in the arable belts; stock farming, however, was less affected by foreign conditions, and oats cultivation never suffered to the same degree as that of wheat.

Having reviewed some features of the development of Gallovidian agriculture, we may now turn to a consideration of the growth of population in the same period. The averages given below for the natural units are group figures based on the parish statistics, and the graphs (Fig. 3) have been constructed from these.

The most important feature of this table is the importance of the year 1851. The actual parish figures show that in Wigtown some 14 parishes out of 17 had their maximum population in that year, as had 10 out of 26 parishes in Kirkcudbright. The decline of the population in the period 1861-71 was greatly increased by the facility for rural exodus provided by the new railway; it is notable in such parishes as those of Kelton, Crossmichael, and Penninghame, while a general decline is also seen in the isolated coastal areas consequent on the falling off of sea traffic.

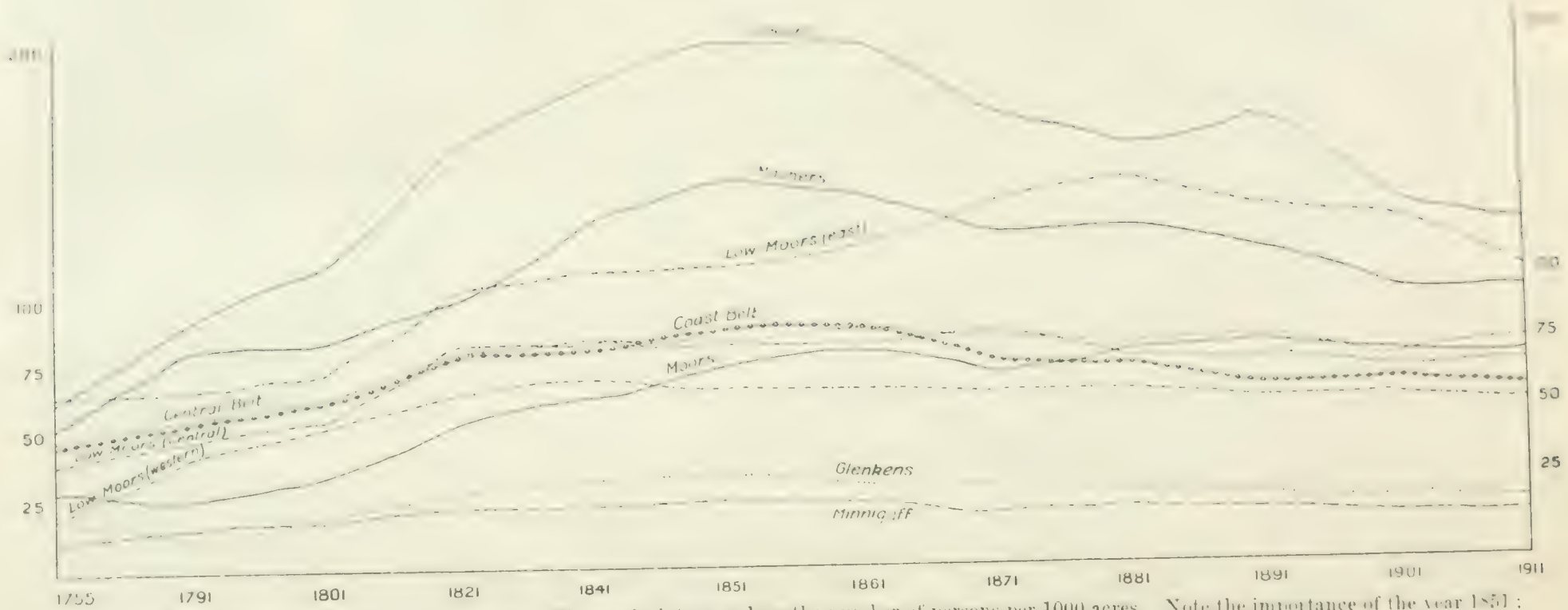


FIG. 3.—Graphs to illustrate Population Averages. The vertical figures show the number of persons per 1000 acres. Note the importance of the year 1851: the decline from 1861 onwards; the later fall in the Stewartry as a whole, and the stationary character of the hill population.

The fluctuations in population in the period 1841-81 show that the difficulties of readjustment to changed conditions in agriculture have been greatest in (*a*) the Moors of Wigtown; (*b*) the Rhinns, especially parishes divided between arable land and hill pasture such as Kirkcolm and Portpatrick; (*c*) the Low Moors of Kirkcudbright, in especial Kirkmabreck and Girthon parishes, the population being much more stable in the more arable central portion (parishes like Balmaclellan, Parton, and Crossmichael).

The general decline which follows 1851 coincides with the agricultural change which took place from stock-cattle rearing to dairy farming. The change was most marked in Wigtownshire as cattle rearing was there more highly developed. The population maxima came later in the Stewartry, where the economic change was probably later. As the dairy-farming stock was almost entirely Ayrshires, it was natural that the industry should first penetrate Wigtown.

Population Figures based on Parish Statistics per 1000 acres.

Year.	Rhinns.	Moors	Machers.	Glenkens.	Minnigaff.	West Low Moors.
1755	65·5	31·8	55·6	19·0	13·7	22·8
1791	93·6	25·9	83·8	11·4	16·1	43·1
1801	111·0	34·1	83·7	18·3	18·2	52·6
1821	158·5	53·4	99·1	26·0	21·8	64·3
1841	179·4	61·5	127·3	30·4	20·7	68·5
1851	194·3	72·9	142·9	30·9	23·3	64·9
1861	192·6	75·5	135·8	29·0	20·5	63·9
1871	167·1	68·8	120·2	26·9	17·3	61·6
1881	154·1	74·7	122·5	24·5	18·0	60·7
1891	161·4	76·4	113·6	21·3	16·1	56·9
1901	130·4	74·4	96·2	18·9	14·7	57·0
1911	123·0	70·9	95·3	17·9	13·6	53·3

Year.	Low Moors (central).	Eastern Low Moors.	East Galloway (central)	Lowlands (coast).
1755	40·3	66·0	50·5	48·2
1791	48·0	67·0	57·6	55·7
1801	53·8	71·0	63·9	62·5
1821	82·7	102·9	79·1	79·6
1841	81·1	108·7	81·5	77·9
1851	80·1	109·7	82·6	85·2
1861	80·0	115·5	84·9	85·8
1871	82·8	129·9	81·0	73·1
1881	74·2	142·5	78·2	71·1
1891	72·0	128·8	79·0	63·9
1901	66·3	123·0	72·6	64·7
1911	64·5	103·0	75·2	59·4

(*Note.*—The figures for 1755 and 1791 are derived from the Old Statistical Account of Scotland, and are not very reliable. The remainder are given decennially from 1841 and are all drawn from the census reports.)

The relative proportion of the population in the different units has been maintained right down to the present day. The north and west parts of Kirkcudbright contain the largest amount of uninhabited ground, this being the unreclaimed moorland of over 1000 feet. Small unpopulated areas also occur in the southern moors and in the north-east where the moors break up the hill-pasture zone. The contrast in the three divisions of the Low Moors and the larger agricultural potentiality from west to east is brought out in the population averages. The densities of the East Galloway Lowlands are also notable, the coast belt varying much more than the richer central belt. In Wigtown the extensive Moors sheep-farming area and the considerable moorland waste result in a less density than that found in the Machers. The high figures for the Rhinns are largely due to the rise of Stranraer, and similarly the burghal populations of Wigtown and Newton Stewart have raised the Machers figures. Thinly peopled spots occur in the flow-moss country of Mochrum and Old Luce.

The density in the hill-pasture zone behind Portpatrick, in the Moors, the Low Moor belt, and the lower portions of the southern coastal moors falls between that of the agrarian and moorland zones, and here are the principal sheep-rearing districts of Galloway. The true agrarian population is seen in the coast and central belts of Kirkcudbright, the Rhinns and Machers and the valleys leading into Ayrshire. Denser nuclei occur on the east side of the Machers and in the neighbourhood of market towns and urban centres in the east Galloway Lowlands, while the population culminates in burgh towns like Stranraer and Maxwelltown.

The historic changes in the population are most marked in the lowlands, and there has been a general stability in the hill lands where the sheep industry has always been the leading type of rural economy. The main movement within the province, particularly after the development of communications, has been towards the central belt and market towns of Kirkcudbright, while in Wigtown, where there is less variety in rural life, the movement has been much less marked. On the other hand, the exodus to Nithsdale, England, and the Midland valley has been far greater than the internal migration. The large number of men, especially a half-century ago, who left the hill areas to go to "the Pack," or Scotch drapery trade, in the towns is significant in a country where shepherding and local homespun manufactures have been immemorial industries.

GLASGOW IN THE PRE-REFORMATION PERIOD.[1]

Glasgow is fortunate in having its history related by many writers of repute, beginning with John McUre in 1736 and continued by others down to our present day. But since the completion of the publication of the City Charters and other records there has been felt a want of a history based principally on these muniments. The late Sir James Marwick's *Early Glasgow* provides a brief instalment of such a history, but there was still room for the book under review.

The period covered by this first volume of the *History of Glasgow* extends from the earliest evidences of occupation until the beginning of the Reformation in Scotland. The seat of an important and wealthy bishopric, the chief town of a wide barony with early trading privileges, Glasgow in those days owed much to the fostering care of the Church. Although only a bishops' burgh until it received its charter as a royal burgh in 1611, through the favour of successive sovereigns it possessed from the latter part of the twelfth century most of the privileges conferred on royal burghs. These privileges, so far as trading rights were concerned, led Glasgow into active competition and rivalry with the ancient neighbouring burghs of Rutherglen, Renfrew, and Dumbarton. But the main source of the prosperity of the city was the presence in its midst of a large ecclesiastical establishment. The Cathedral with its shrine of St. Kentigern attracted people from a wide distance, and a large body of clergy—many of them possessed of wealthy endowments—resided in its neighbourhood permanently or for considerable portions of the year. In the words of John Major, theologian and historian (quoted in the text), the Cathedral of Glasgow was "second to no church in Scotland for its beauty, the multitude of its canons and the wealth of its endowments." At the time of the Reformation there existed in Glasgow besides the Cathedral with its chapter of thirty-two canons, its college of choral vicars and a numerous body of chantry priests, also the Collegiate Church of St. Mary and St. Anne with a provost and eleven prebendaries, the Convents of the Dominican and Franciscan Friars, several hospitals and chapels besides the University and Grammar School. The presence of a large body of clergy connected with these establishments brought much trade to the town—a trade greatly diminished for a time by the ecclesiastical changes of the Reformation.

This volume necessarily deals largely with the affairs of the Church, and Dr. Renwick, who alone was responsible for this portion of the *History*, has been well equipped for his task. The ample bibliography presented to the reader indicates the wide extent of his studies, and he has made full use of the records of the bishopric and municipality. After indicating the early geographical changes within the area of the city and its immediate neighbourhood the author proceeds to trace the origin and

[1] *History of Glasgow.* By Robert Renwick, LL.D., and Sir John Lindsay, D.L. Vol. I. Pre-Reformation Period. Glasgow: MacLehose, Jackson and Co. 1921.

growth of the bishopric, the succession of the bishops and archbishops — some of them pre-eminent as officers of state — the building of the Cathedral in its several stages, the development of the burgh, the rise of the merchant and craft gilds and their trading privileges. Interest in the story of Glasgow is maintained by being linked up with the general history of Scotland, and the progress and relative importance of the burgh are indicated from time to time by comparing its state with that of the greater burghs of the country.

Much interest attaches to the topographical information given, and two excellent sketch maps—one of the city about 1560 and the other showing the sites of the principal buildings in the sixteenth century—are helpful to the descriptions in the text. Dr. Renwick may be said to have done his best work as a topographer, for he devoted much time to the careful editing of the old protocol books of notaries and town clerks of Glasgow which deal with heritable property in the city, and his volume of *Glasgow Memorials* following upon the completion of the former work contains a great amount of information on the sites and localities of ancient Glasgow.

The illustrations in the book are excellent, and there are several reproductions of episcopal and other seals. A greater use, however, might have been made of the older views of Glasgow, although possibly it is intended to include some of these in the succeeding volumes.

We have here a scholarly and accurate work by a genuine lover of his subject, and it is much to be regretted that Dr. Renwick did not live to continue the *History* beyond the period embraced in this volume. It is understood, however, that it will be carried on by Sir John Lindsay and Mr. George Eyre Todd and brought down to date.

JOHN ARTHUR BROWN.

TERRESTRIAL AND CELESTIAL GLOBES: THEIR HISTORY AND CONSTRUCTION.[1]

DR. STEVENSON'S work, which he claims to be the first detailed historical treatise in English on globes terrestrial and celestial, contains a chapter on "The Technic of Globe Construction," but otherwise is strictly chronological in treatment. It thus incidentally forms a record of the development of geographical knowledge from the age of the Discoveries to the close of the eighteenth century. It is admirably and fully illustrated with photographs, and with blocks in the text.

The first terrestrial globe would appear to have been constructed about B.C. 150 by Crates of Mallos, but Ptolemy (A.D. 150), who with the Revival of Learning became the father of modern geographi-

[1] *Terrestrial and Celestial Globes: Their History and Construction.* By Edward Luther Stevenson, Ph.D., LL.D., 2 vols. New Haven: Published for the Hispanic Society of America by the Yale University Press, 1921.

cal science, was the first to demonstrate the value of marking on the globe's surface the network of parallels and meridians. The Middle Ages, however, looked unfavourably on any view of geography which could not be squared with the statement of Isaiah, "It is He that sitteth upon the circle of the earth"; and terrestrial globes went out of favour, although celestial globes were constructed. The earliest modern terrestrial globe is either the "Erdapfel" of Martin Behaim (1492), or another, known as "the Laon globe." Dr. Stevenson finds a difficulty in the fact that, while the Laon globe would appear from the geographical information represented upon it to be the earlier, yet it bears a record of Portuguese explorations up to 1493. It would seem a possible explanation that this inscription was engraved on the copper surface of the Laon globe subsequent to its completion, in order to bring it up to date. However this may be, there was at any rate by the close of the fifteenth century a growing interest in globes and their construction, and in Vienna, early in the sixteenth century, Conrad Celtes seems to have begun their use in schools.

Hitherto the globes constructed had been, like the Laon globe, of engraved metal; of parchment fastened over composition fashioned into a ball, like the globe of Behaim; or of wood. Early in the sixteenth century, however, and, as Dr. Stevenson thinks, most probably by the Rosselli family in Florence, the manufacture was begun of globes with printed gore maps, a method which naturally cheapened and multiplied production greatly. Germany also soon had centres of geographical knowledge, and the famous Waldseemüller produced maps and globes whose outlines were repeatedly followed in the first quarter of the century. It is on one of his maps, dating from 1507, that the name "America" first appears as applied to the New World. Most of those early map-makers represented the New World as independent of Asia, though North America was usually shown as an island ("Parias"), and South America only separated by Magellan's Strait from a great Antarctic continent called "Brasil." About 1525, however, soon after Magellan's expedition, there was apparently a reversion to the old idea that America formed part of Asia, and the "*stretto dubioso*" formerly shown between North and South America also disappeared. It is not till the World Map of Mercator, published in 1538, that we find again a representation of America as separated from Asia by a narrow sea. Mercator's globe, which appeared in 1541, marked a great advance on previous work, and gave the first instance of the use of an equidistant polar projection in globe construction.

Towards the end of the sixteenth century there was a transference of the primacy in globe-making from Italy, which had hitherto been predominant, to the Netherlands, where it remained till the beginning of the eighteenth century, especially associated with the families of Van Langren, Hondius, and Blaeu. This change was naturally connected with the rise of Dutch sea-power; and in the same way the rise of English sea-power was associated with the construction of the first English

terrestrial globe of which we have direct record, by Emery Molyneux of Lambeth in 1592. It bears traces of the influence of Raleigh, John Davis, Barents, and Willoughby, and shows the tracks of the voyages of Cavendish and Drake. Molyneux had not, so far as is known, any successor as a practical globe-maker in London for more than a century, till Joseph Moxon (1627-1700) issued a priced catalogue of his geographical publications from his shop, "At the Sign of the Atlas," in Russell Street. It is of interest that Moxon's First Meridian was not yet that at Greenwich, but that of "the Ile Gratiosa, one of the Iles of Azores."

Towards the end of the seventeenth century globes began to be displaced by maps and charts in the relative importance which they had as seamen's instruments for use in navigation; and France, thanks partly to generous State subsidies, took the place of the Netherlands in the van of geographical science. Both changes are largely associated with the famous Guillaume Delisle (1675-1726), who, with the support of the King and the Royal Academy of Science of France, revolutionised map construction by using astronomical observations to determine longitude. In maps before his day, for example, the length of the Mediterranean had been shown as 62, instead of really only 42 degrees of longitude. About the middle of the century we have apparently the first recorded Scots maker of globes, James Ferguson (1710-76).

Enough has been said to show the great interest of Dr. Stevenson's book. It will certainly remain for a long time as the standard work on its subject, and indeed so thoroughly has it been done that it is difficult to think of its ever being superseded. W. R. KERMACK.

RECENT ARCTIC EXPLORATION.[1]

THE volumes in which Messrs. Rasmussen and Stefansson state the results of their journeys are, from a general point of view, models of what such works ought to be. They are handsomely produced on good paper with excellent type, they are beautifully and abundantly illustrated, and their maps and indexes are adequate. Both books are written in an attractive style, and are of absorbing interest. The translation of Mr. Rasmussen's book is well done. The only adverse criticism we care to make of it is that we fail to understand what is meant by a "cooking barometer" on page xx of the Introduction.

[1] *The Friendly Arctic.* The Story of Five Years in Polar Regions. By Vilhjalmur Stefansson, author of *My Life with the Eskimo*. Illustrated. London: Macmillan and Co., Ltd. 1921. Price 36s. net.

Across Arctic America. The Story of the Thule Expedition from Melville Bay to Cape Morris Jesup. By Knud Rasmussen. Translated from the Danish by Asta and Dudley Isaacs. With Preface by Admiral Sir Lewis Beaumont, G.C.B. With numerous illustrations in black and white, eight colour plates, and maps. London: William Heinemann. 1921. Price, 36s. net.

By his long connection with the country and his numerous journeys in it Mr. Rasmussen has made Greenland his own. He speaks the language fluently, and is accepted by the Eskimo as one of themselves. This gives authoritative value to his ethnological pronouncements. The main object of the expedition—which was successfully accomplished—was to chart "the last unknown reach of Greenland's north coast on the stretch between St. George Fjord and de Long Fjord," and to pay special attention to the land between Nordenskjöld Inlet and Independence Fjord. It will be remembered that Mylius Erichsen had reached Peary Land from the east and had proved it to be joined to Greenland, and not an island as Peary supposed. This expedition reached it from the west.

Mr. Rasmussen had determined to "live off the country" to a large extent, and all went well until the break-up of the sea-ice in summer. Then seals became difficult to get, and many of those shot sank and were lost, so that the party set out homewards across the inland ice with inadequate provisions. All the dogs left were killed and eaten, and the party just managed to get off the ice, all of them in a very weak condition from hunger. Mr. Rasmussen and an Eskimo set off for Etah to obtain relief for the four men—two Europeans and two Eskimo—who were left behind: when a rescue party arrived three survivors only were found. It appeared that Dr. Wulff, the botanist of the expedition, being unable to eat the hares which were the only food obtainable, had completely broken down, and had insisted on his companions leaving him alone. The rescue party searched for his body, but were unable to find it owing to freshly fallen snow. It is a little difficult to understand why the party did not stick together, as they could not in any case hope to reach Etah without assistance, so that abandoning Dr. Wulff did not help the others much, if at all.

Mr. Stefansson's book records the results of five years' persistent and on the whole successful work in the region to the north of Canada. The most outstanding feats were the journeys over the unbroken Arctic Ocean to the west of Banks and Prince Patrick islands, and the discovery of new islands in the north of the Parry Archipelago. The author is a trained ethnologist, and in this book he has added much to our knowledge of Eskimo life and customs, a work so well begun in his former volume, *My Life with the Eskimo*.

We could say much in commendation of Mr. Stefansson, but we have space only for two or three very important matters on which we do not altogether agree with him. In the first place, it is clear, in spite of the author's restraint, that there was a good deal of discord among the members of the expedition. The most serious result of this was the complete breach between the leader and his second in command, Dr. Anderson, who was a friend of several years' standing, and who had been with him during his previous residence in the far north. We have not seen Dr. Anderson's views, and can therefore only suspend judgment on the general merits of the question. But it appears that many

of the subordinate and some of the superior members of the party were merely hired servants, and belonged to many different nationalities. This does not encourage unity of purpose and action, nor is it favourable to good discipline.

Secondly, Mr Stefansson claims to be the first Arctic explorer to prove—and that in spite of the unbelief of all and the opposition of most of his followers—that it is possible to "live off the country." This applies, he says, even to the ice-covered ocean far from land where all his predecessors, especially Peary, had seen practically no signs of life. Now the author, on leaving Alaska, had provisions (pemmican, etc.) for men and dogs which lasted until considerably after they had turned eastwards towards Banks Island. At their greatest distance from the mainland (200 miles) he says, "signs of game were getting fewer every day." The first seal was killed about half-way between the turning point and Banks Island. When Mr. Stefansson at later periods did succeed in "living off the country" he was either on land or not far away from it. Lastly, the suggestion that the "fertile prairies" in the Arctic Archipelago will be a source of meat supply in the future can only be dismissed as an absurdity.

Thirdly, we strongly dislike the author's treatment of his predecessors. It is not a question of direct attack, for that is avoided with some skill, but a subtle depreciation, combined with a cocksureness as to his own methods, which produces an unpleasant effect on the reader.

T. S. M.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

At a special meeting of the Society, held on 16th September 1922, it was unanimously agreed to admit Scottish University Students as Associate members.

GEOGRAPHICAL NOTES.

EUROPE.

The Ordnance Survey.—The *Annual Report* of the Ordnance Survey for the year 1921-22 records the fact that there is no longer an Ordnance Survey of the United Kingdom. On January 1, 1922, the Survey of the Six Counties of Northern Ireland was transferred to the Government of Northern Ireland, and on April 1 the Survey of the rest of Ireland was transferred to the Provisional Government of the Irish Free State. The Survey of Ireland was founded in 1825, and the country was thereafter triangulated and surveyed by chain on the scale of 6 inches to 1 mile, the Survey being completed in 1840. In 1887

the Survey on the 25-inch scale was begun. This was completed in 1914, so that work now consists of revision only. The Director-General gives it as his opinion that, from the technical standpoint, the union of the Surveys of Great Britain and Ireland for nearly one hundred years was to the advantage of both.

Among other items in the *Report* we note that the account of the revised Geodetic Levelling of England and Wales was ready for publication in April last. In connection with the new Ordnance Datum at Newlyn it is stated that the old rough assumed Mean Sea Level at Liverpool differs from the Mean Sea Level at Newlyn by +0·13 of a foot.

The Director-General (Col. Sir C. F. Close) states that this is the last *Report* which he will write, as he retires after a period of eleven years' service. He discusses briefly the probable lines of future work.

The Structure of the South-West Highlands.—Because of its local interest we feel that some mention must be made here of a recent paper on this subject by Mr. E. B. Bailey, M.C., B.A., although the contents of the paper belong to geology and not to geography. The paper referred to appears in the *Quarterly Journal* of the Geological Society, vol. lxxviii. part ii., and it is briefly discussed in a paper by several notable geologists in the *Geological Magazine*, vol. lix. The first paper is illustrated by a coloured geological map and a number of diagrams.

Before noting the main points in Mr. Bailey's paper, it may be well to note briefly that recent work on the interpretation of the structure of the Alps has been largely concerned with what Alpine geologists call "nappes." Mr. Bailey defines a nappe as follows: "A nappe is a mass brought forward to a notable extent by recumbent anticlinal folding or by thrusting." Again, it will be remembered that, owing especially to the work of Drs. Peach and Horne, the complex structure of the North-West Highlands has been unravelled, and the results have been to suggest considerable similarity with the conditions found in the Alps, so that the North-West Highlands have become a world-famous place of pilgrimage for geologists. Mr. Bailey in his paper attempts an interpretation of the rocks of the South-West Highlands in the same way.

He recognises three great structural elements, to which he gives names based on, or compounded from, local place-names. Thus he recognises first a Loch Awe Nappe, extending south-westwards from the northern end of that lake till it is lost sight of under the sea, and having a breadth of about twenty miles. This rock-mass he believes travelled into its present position from the north-west. To the west, in Jura and Islay, and to the east, extending to Ben Ledi and the Highland Line, and therefore assumed to underlie the Loch Awe syncline, is found his second element, the Iltay Nappe, a hybrid term compounded from Islay and Loch Tay. This nappe includes two important recumbent folds, the Ben Lui fold and the Carrick Castle fold. Finally, to the north lies

the so-called Ballachulish Foundation, a structural complex whose name is compounded from Ballachulish, Appin, and Loch Eil. This complex is characterised by great recumbent folds, indicating movement towards the south-east, and to the south-east passes beneath the other two elements.

The Population of France.—In the *Annales de Géographie* for January 15 last, M. Maurice Zimmermann discusses the results of the French census of March 1921, and the changes in the number and distribution of the population of France since 1872.

In 1921 France, including Alsace-Lorraine, contained, in round numbers, 39,200,000 persons, as against 39,600,000 in 1911. Deducting, however, the departments reunited since the war, with approximately 1,700,000 inhabitants, the two census figures show an apparent loss of over two millions in 1921. The actual loss, to be ascribed to war casualties, to the great influenza epidemic of 1918, and to the lowered birth-rate during hostilities, is, however, notably greater, approaching 2,400,000. This is concealed in the total figures owing to the presence in the country of many foreigners, who have been entering the country in steadily increasing numbers in the last decade, and this despite the exodus of the subjects of countries which were enemies during the war. One of the most striking features indeed of French statistics is the tendency for the gaps left by the low French birth-rate to be filled by immigration from the adjacent countries, and this was very marked during the war.

Excluding the devastated departments, in which the conditions have been altogether abnormal, and the war losses, regarded as affecting all departments equally, M. Zimmermann recognises three great zones of depopulation in France. The first affects the mountain regions and their margins. Thus the French Alps have been losing population for half a century, and show a loss in the last decade of fourteen to fifteen per cent. In the Central Plateau, on the whole, the rate of loss is in the neighbourhood of ten per cent. On its western margin, in the basin of Aquitaine, the losses are much heavier. Thus the department of Lot has lost thirty-seven per cent. of its people since 1872, of whom nineteen per cent. disappeared in the period 1891-1911. In the last decade the losses in this region exceeded in places those of the invaded departments.

A second belt of depopulation extends along the calcareous plateau from Berry to the Vosges. Here again the phenomenon is of old standing, and of recent years has tended on the one hand to diminish slightly in intensity, and on the other to extend over a larger area. Finally, a third zone of depopulation is found in the three rural departments of Manche, Orne, and Mayenne, which have lost nearly eleven per cent. of their inhabitants in the last decade. In Normandy as a whole, however, it would seem that the decrease is less marked than it was, in part because of the influx of foreigners. Brittany, which since 1872 has been an area of increase owing to the high birth-rate, has lost notably in the last

decade. But it would appear that this is a temporary phenomenon due to the war.

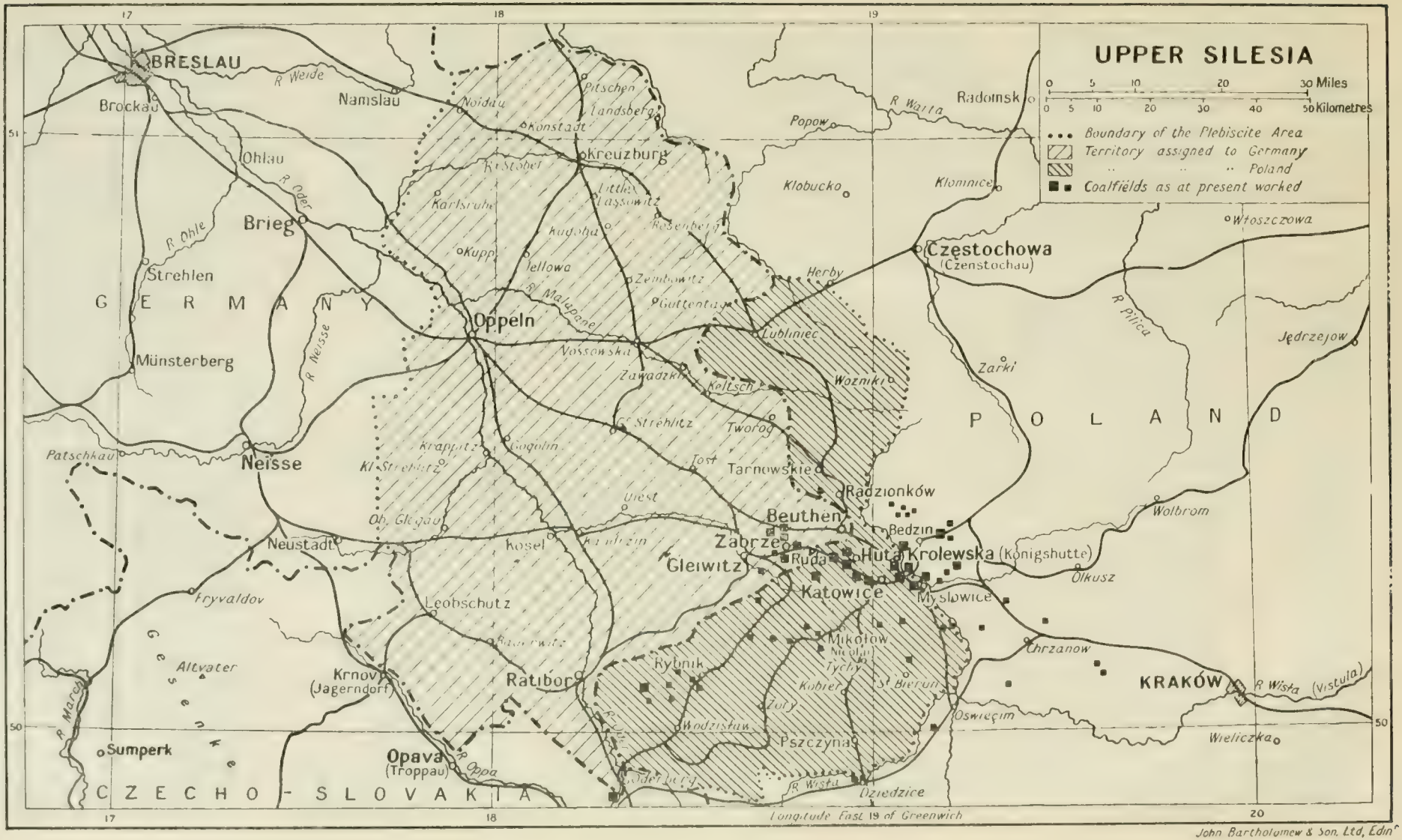
The total loss of population is of course far less than the above figures would suggest, so that there is obviously in progress a redistribution of population in France. M. Zimmermann considers this in an interesting classification of the nineteen departments in which there has been a notable increase during the last half-century. This brings out two striking facts, first the attractive influence of the large centres of industry, and second the peripheral movement, *i.e.* from the centre to the margins. The latter is partly to the sea-coasts, with their varied resources, while the land-frontiers also generally show an increase, due partly to the natural resources and partly to alien immigration. As regards the influence of the large towns, it is noted that where a department has a town containing 50,000 to 100,000 people, that department shows only a moderate degree of depopulation, varying from three to seven per cent. Where the principal town reaches or passes the limit of 100,000 inhabitants, the departmental population tends to remain stationary. Where a large city of 500,000 or more people is present, the departmental population shows vigorous growth. This is marked in the case of Lyons and Marseilles, but very striking in the case of Paris and its suburbs. The sea-coasts attract population especially at the mouths of the great rivers, and in regions where immigration of aliens is favoured. Of these aliens Belgians tend to enter along the line of their own frontier. Italian immigration presents some peculiar features. Up till 1911 they tended to enter by the natural route along the Mediterranean coast, and to settle along the coast-line of Provence. It would appear, however, that this area has reached its saturation limit, and the wave of Italian immigrants is now pressing up the Rhone-Saône valley, so that from the Vosges to the Mediterranean they predominate over other foreigners. A peculiar feature of the war period has been the influx of Spaniards at either end of the Pyrenees. These incomers are to be found not only in the rural districts but also in the industrial areas, where they work as factory hands.

Finally, it is notable that in M. Zimmermann's classified list of departments showing an increase of population since 1872 only two, Finistère and Morbihan (Brittany), owe this to their high birth-rate; both of these during the last decade showed an average *loss* of nearly seven per cent., regarded by the author as temporary and due to the war.

The New Frontier in Upper Silesia.—(*With sketch-map.*) We publish here a sketch-map showing the new frontier between Germany and Poland in Upper Silesia, and desire at the same time to draw attention to an article, with several sketch-maps, by M. Pierre Dumas which appears in the *Annales de Géographie* for January 15 last. This article deals in some detail with the probable effect of the partition on the mining and metallurgical industries in the area, but the following brief abstract is limited to the more general points.

Upper Silesia under German rule was of the nature of a "political peninsula" for it was surrounded on three sides by foreign States, a fact which necessarily had great influence on markets. Further, from the point of view of communications with the rest of Germany, it may be said to have had but a narrow outlet by the valley of the Oder, and even at Breslau Upper Silesian coal had many competitors in the markets, including both English coal and that from the Ruhr region. This point is not without importance, for much of the Upper Silesian coal enabled in the pre-war period an external market, and that market, owing to frontier changes, has in part become "internal," *i.e.* Polish.

Geographically neither the old frontier nor the new one can be said to be "natural," in the sense of corresponding to marked relief features. The significance of Upper Silesia may indeed be said to depend upon two facts, which in combination help to explain the difficulties in drawing frontier lines. In earlier days its main importance lay in the fact that it is a crossing point of routes. One of these comes from the south by the Moravian Gate, while the other, an east-to-west line, leads from Cracow and Galicia to Breslau and the Oder valley. The contact of these routes accounts for the age-long conflict between Poles and Germans, the Germans advancing south down the Oder valley, and the Poles pushing westwards. The Polish element is thus very old, despite the early loss of the area to the Polish Crown, and their higher birth rate has apparently enabled them to maintain their position, despite German assimilation. The second fact of importance is due to industrial developments, especially in what M. Dumas calls the industrial triangle. This is an area of rather over 100 square miles, extending from Beuthen, a few miles north of Beuthen, which forms the point of the triangle, to a line drawn between Gleiwitz and Myslowice, its base. Large-scale industry has been established here because of the contact between coal-bearing beds and limestones (Muschelkalk) containing iron, zinc, and lead. Of the five great industrial centres, three, Gleiwitz, Beuthen and Zabrze, remain German, while Konigshutte and Kattowice become Polish. The difficulties in drawing a frontier are due to the fact that industrial developments have been due to German enterprise and capital, and the towns, whatever the nature of their populations, tended to opt for Germany, while in the south and south-east the towns voted for Germany and the rural communes and mining centres voted for Poland. The actual frontier is of course entirely of the nature of a compromise, and cuts what was once a continuous industrial area into two parts. Thus Germany loses, on the basis of the figures for 1913, about one-quarter of the supplies of coal, and one-half of the coking coal, so important for the metallurgical industry. She loses almost the whole of the supplies of zinc, and most of the iron furnaces. The Polish area, on the other hand, is poor in coke. M. Dumas believes that the transitional period of fifteen years which has been arranged for may enable the area as a whole to adapt itself to the new conditions, and that it is possible that in the



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future it will have its outlook directed eastward, and play an important part in the reconstruction of this part of Europe.

Asia.

Geology and Geography in Japan.—We have received from the National Research Council of Japan the first issue of a new periodical called *Japanese Journal of Geology and Geography*. It contains several original articles, with fine illustrations, and a number of abstracts of papers by Japanese authors. The articles are all in English, as are also the abstracts, with the exception of one which is in German. The new periodical thus makes it possible for Western readers to follow the progress of the two subjects in Japan.

Among the articles we note one on the Mud Volcanoes at Minbu, Burma, by Mr. Toshikadzu Niiya, geologist to the Japan Oil Company. Minbu is on the west bank of the Irrawadi, about 250 miles above Rangoon, and seven mud volcanoes occur in its vicinity, six in a straight line, in close proximity to one another, and the seventh a little distance away, on the same line, which is apparently partly due to an anticlinal fold and partly to a fault. The largest volcano is of regularly conical form, and was apparently formed about seventy years ago. It has a diameter of about 250 feet, a height of 60 feet, and a crater of 25 feet in diameter. The gas evolved appears to be a mixture of marsh gas and highly volatile petroleum, and is gently and intermittently evolved. The volcanoes are apparently especially active during the rainy season.

One of the abstracts deals with the falls of yellow sand or dust which occur from time to time in Manchuria, Korea, and even in most parts of the Japanese Archipelago, from Kyushu in the south to the western half of Hokkaido in the north. The dust apparently originates in the loess-covered areas of the Hwang-ho basin and the Mongolian desert, and its transport is due to the pressure conditions in the intervals between the summer and winter monsoons. Thus the prevailing seasons of fall are November and December and February to May. Twenty such falls have been recorded in the last eight years, and these are arranged in categories according to the pressure distribution at the time.

America.

Rainfall and Agriculture in Chile.—The American Geographical Society is at present issuing a series of small pamphlets, under the general title of *Research Series*, dealing with South American problems. Several of these pamphlets have reached us, and we note especially two by Mr. Mark Jefferson, one (No. 7) dealing with the Rainfall of Chile, and the other (No. 6) with Recent Colonisation in Chile. The first-named is illustrated by coloured maps, including a new rainfall map. The author states that the rainfall conditions are inadequately represented on existing maps, which bring out only two facts, the great

dryness of the north and the wetness of the south. The distribution of rainfall in Central Chile, the most important part of the country, has never, he states, been properly set forth previously. What he regards as the essential feature is the dryness of the north-to-south valleys which lie between the interrupted coastal mountains and the Andes. Precipitation increases southward along the line of these valleys, but is always less than on the coastal hills on the one hand and on the slopes of the Andes on the other. The valleys contain the chief fertile areas of Chile, and since irrigation is possible to supplement the winter rainfall, the belt containing them, from lat. 31° to 38° S., is the real home of the Chileans. The relative dryness of the valleys, also, means that forest growth is absent, so that clearing of the land was not necessary.

The second pamphlet in essence applies the above conclusions to the distribution of population and agriculture in Chile. Its title is something of a misnomer, for the point emphasised is that Chile, despite all that has been said and written, is not a country suitable for colonisation, and the colonists actually present are few in numbers. Mr. Jefferson divides the country into three zones on the basis of the facts already set forth. In the deserts of the north agriculture is possible only over a few square miles of surface, and the necessary hands for working the nitrate and other deposits are available within the country itself. There is no room here for immigrants. Central Chile has plenty of labourers for its limited area of fertile land, and no great extension of cultivation appears to him possible. Southern Chile is hampered by the heavy rainfall, the swampy land, which makes communications difficult, and the extensive forests. The latter contain few timber trees of commercial use, the climate makes it difficult to use fire as a clearing agent, and the author takes a very gloomy view of possibilities here.

The Forests of the Dominican Republic.—Mr. W. D. Durland contributes to the April issue of the *Geographical Review* a general article on this subject, containing two useful maps. The article gives an account of the extensive, and hitherto little utilised, forest resources of the country, and includes an interesting observation on the effects of negro methods of clearing land, which deserves special note. The northern slopes of the central chain of the republic, from the vicinity of Cotui, on the Yuna river, westwards to the Haitan border, are clothed with open pine forest, presenting a markedly temperate appearance, for tropical species seem to be absent. The forest consists predominantly of *Pinus occidentalis*, occurring in open park-like stands, with an abundant growth of wild grass among the stems. The peculiar feature is that this pine type does not occur at all in Porto Rico, and in Cuba has a very limited distribution, being found on certain rugged peaks of the Sierra Maestra, at heights of not less than 1800 feet above sea-level. Its presence over a relatively extensive area in San Domingo is apparently to be ascribed to the native method of burning over areas of evergreen hardwood forest, raising three or four crops, and then abandoning the

land. Probably the areas now occupied by the pine forest once carried forest of this type, but the cutting, burning, and cropping has so deteriorated the natural fertility that reproduction has become impossible. It would appear probable that the pine once occurred in small numbers on the heights, as in Cuba. With the degeneration of the soil it has been able to descend and, in the absence of competition from other forest species, to form open woods. The suggestion is interesting, for well-authenticated examples of such human effects on the natural cover are not numerous.

Loess Formation in Western United States. Mr. P. P. Peterson gives in *Science* for 27th January last an account of some observations which he has made on the formation of soils in the Columbia Plateau by wind. The soils are often a hundred or more feet deep, and though dust-storms are frequent, the dust is not of local origin but comes from a distance. Showers of rain or snow cause the deposition of the dust particles, which do not appear to rise again. These wind-formed soils are thus of the nature of loess, consisting of particles derived from an arid or semi-arid area, deposited in a more humid one. In the particular case studied the area of deposition is the region between the Columbia Valley and the Bitter Root Mountains, that of origin the dry eastern slope of the Cascade Mountains. Under ordinary circumstances it is difficult to measure the amount of dust deposited by a single wind-storm, or to estimate the annual increment. But the deposition of dust on snow gives a favourable opportunity, and one such was taken by the author at Moscow, Idaho, in January 1917. Snow fell one day, and the following morning was found to be covered by chocolate-coloured dust. From the known area of the snow-clad region it was seen that the dust must have come from a distance of one hundred miles or more. By melting the snow and collecting the dust an estimate of 140 lbs. per acre for this one fall was arrived at. Other observations, checked in various ways, lead Mr. Peterson to believe that some 7500 lbs. fall per acre, per year, raising the soil level 4 inches in the course of a century.

GENERAL.

Personal.—Dr. J. F. Unstead, head of the Geography Department, Birkbeck College, has been appointed Professor of Geography in the University of London, in respect of the post held by him at University College.

ECONOMIC GEOGRAPHY.

World Commerce and the War. Under the title of *Prospettive Economiche, 1922*, Signor Giorgio Mortara publishes a somewhat bulky pamphlet, prepared under the auspices of the University Bocconi of Milan. It would appear that the publication is to be annual, and that the present one forms the second issue; it is, however, the first to reach

us. It consists of a series of articles on the main commodities of commerce, considered especially, but not exclusively, from the Italian point of view, with other sections on transport by land and sea, public finance, and so forth. The title seems scarcely a suitable one, for the great interest of the book lies not in its speculations as to production during the current year, but in its discussions of the effect of the war and its consequences on world commerce. Anything in the nature of a complete abstract is of course impossible in view of the mass of detail included, but we may note the contents of one or two articles, in order to suggest the nature of the contents.

The article on *wine* points out that in the pre-war period France and Italy together produced nearly two-thirds of the world supply, Spain, with a production only one-third of that of Italy, coming next. In the period 1909-14, Italy had 4,400,000 hectares under vines, but produced less wine than France with 1,600,000 hectares. The figures are, however, less striking than they seem, for while in France the vine is grown in pure cultures, in Italy it is of course common to find several crops on the same plot. Despite her large production Italy exported less wine than Spain, most of the product being absorbed by the home market. In the war years Italian production fell notably, and though there was a rise in 1920, in 1921 it fell even below that of the war period. This is due less to a diminution of the area under vines than to the ravages of phylloxera, perhaps induced by diminished care during the war. Even so, however, financial depression in Italy diminished the home demand so much that the relatively large production in 1920 led to a "wine crisis" in 1921. A foreign market is not easy to obtain, in view of the fact that the wines on the whole are less carefully prepared than the French ones, but the author believes that the production of table grapes and raisins for the foreign market presents possibilities.

The chapter on *silk* raises even more interesting questions. We may limit ourselves to saying that the author shows that as a producer of raw silk Italy was losing ground to Japan before the war, and the war itself, in combination with the resultant financial difficulties, has accelerated the process One reason has been that the rise in the price of living in Italy has made it impossible for producers to compete against Japan. Silk-production in Japan received during the war a special stimulus from the increased demand in the United States during the period of prosperity before the entrance of the States into the war, the silk being imported across the Pacific without the war risks incidental to Atlantic shipping. The industrial depression of 1920-21 led to a collapse in the price of raw silk on the Japanese market, with resultant difficulties, which have not so far however expressed themselves in any great reduction in the production of raw silk. The recommendations made for Italy lie in the direction of endeavouring to find markets for manufactured silk made from home-produced material, as more profitable than the export of raw silk against Japanese competition.

A New Journal. There has been added to our list of exchanges the *Raw Materials Review*, a monthly periodical of which the first issue appeared in May 1923. The first issue contains a number of interesting articles and notes dealing with the supply and treatment of the raw materials of commerce in the different parts of the world. Thus Sir Rickard Redmayne deals with the Minerals of the Empire, Sir O. V. Salomon with the Raw Materials of Peru, and the Esthonian Legation with the Raw Materials of Esthonia. In the last named some account is given of the attempts made to work the large phosphate deposits. An article by Mr. J. S. M. Ward deals with the nettle fibre industry in Germany. During the war the nettle plant was used for a variety of purposes, including fibre production. Since the war period the other uses, for fodder, tea substitute, the making of alcohol and so forth, have been given up, but both in Germany and in Denmark a considerable amount of fibre is still being produced. Curiously enough cultivation proves to be one of the difficulties as the plant will only grow on poor land, while the methods of obtaining the fibre are slow and somewhat costly. The persistence of the industry in Germany appears to be largely due to the exchange problem, which renders the purchase of American cotton difficult. There are a number of other short articles and notes, and there would appear to be a distinct place for the new journal.

The Textile Industry of Poland. M. Georges Lewandowski contributes to the March issue of the *Annales de Géographie* a short article on this subject which contains some points of general interest. He points out in the first place that the fact that both Austria and Germany were manufacturing countries led the Governments of both to discourage, so far as possible, the growth of competing industries in the parts of Poland under their respective control. But in Russian Poland the autonomous Government of 1815 made determined efforts to establish textile industries, and so effectively was the work done that the industries so established were able to withstand all the fluctuations of the economic life of the country which ensued, especially as the result of the steps taken by Imperial Russia to favour internal industry as against that of Poland. The distribution of the textile industries is considered in some detail, but the points which seem of most interest deal with the effects of the war and the resultant territorial changes. The chief textiles manufactured are first cotton, in which case the whole of the raw material is necessarily imported; woollen goods, 97 per cent. of the raw material required being in this case imported; much less important are linen, hemp, jute, and silk. The fact that the raw material was so largely imported in the pre-war period is a serious present handicap, in view of the low exchange of the Polish mark. It is, however, to some extent balanced by the relatively cheap labour available, and the fact that the factories are well equipped and were largely spared by the Germans during the war.

Further, the post-war conditions may be regarded as favourable in

that Polish industry is now freed from the fetters which the Imperial Government of Russia strove to impose, and in that the internal market has greatly increased, at the expense of neighbouring countries, by the unification of Polish territory. On the other hand, the great Russian market is now closed to Poland, and before the war it absorbed about 92 per cent. of the exports. It is of course true that part of this market, in ceasing to be Russian, remains open, but it is nevertheless clear that Poland must seek other outlets for her output. The author suggests the Balkan region and the French colonial market, at present supplied by the more costly cotton goods of Lancashire. Production in Poland, it is interesting to note, though slow to rally after the end of the war, has now reached 55 per cent. of the pre-war output. The workmen employed constitute 92 per cent. of the number engaged in 1913, but it is stated that the eight hours' day has reduced output per man by 50 per cent. The capital involved is largely foreign, and a large number of foreigners, especially Germans, are employed both as engineers, managers, and so forth, and also as workmen.

NEW BOOKS.

EUROPE.

La Rhénanie: Son Passé; Son Avenir. Par Georges Blondel. 4th Edition. Paris: Plon-Nourrit, 1921.

The author states that, for two years since the Armistice, he has been visiting the Rhineland, and this interesting little book sets forth what he found there. He admits that during the middle ages, after Charlemagne, the Germans penetrated to the west side of the Rhine, that the country there became Germanised, and that German became the language of its inhabitants. However, he states that France has always maintained that the Rhine is her natural boundary. This was undoubtedly the case under Louis xiv., the "League of the Rhine" in 1658 having placed all the Rhenish princes under the protection of France. By the Treaty of 1795 the King of Prussia gave the west of the Rhine to France. Prussia recovered it, however, by the Treaty of Vienna in 1815, and held it till the Armistice of November 1918.

When visiting the Rhineland, the author found that the question of religion plays a large part there. The majority of the people are Roman Catholics, and do not like Protestants. Although remaining Germans, they detest the Prussians. While regarding Britain and America as friendly to the raising-up of Germany after the war, the Rhinelanders accuse France of wishing to crush Germany permanently. They bitterly resent the occupation of the Rhineland by black French troops. The majority of Rhinelanders favour the formation of a great Rhenish-Westphalian Republic on both sides of the Rhine and separate from Prussia. Evidently they are federalists and not centralists. The author concludes by remarking: "When we reached the Rhine in November 1918, most of the Rhinelanders imagined that we came to settle ourselves definitely there. Our presence appeared to these peaceful people as a guarantee against revolution. Accustomed to admire the greatness of Germany, they had been dismayed by the fall of the Colossus which they had always deemed invincible. They acquired afresh a high

[illegible] Prussia. But they soon saw that we had no Rhenish policy, and that we lived from day to day without any definite plan. We ought to have induced them to separate themselves more thoroughly from Prussia, and we ought to have shown ourselves the protectors of Rhenish liberties from the government of Berlin."

La Macédoine et les Macédoniens. Par E. Bouchié de Belle. Paris : Colin, 1922.

The author, after serving in France, received in December 1916 a staff appointment in Salonika. He took part in the Allied advance there, but died at Uskub from exhaustion in October 1918, aged forty. During these two years of military service in Macedonia he made the observations contained in this volume. He describes the struggles before the Great War by the powers, both great and small, to keep their footing in Macedonia. Three races aspired to rule it—Bulgarians, Serbs, and Greeks. The last named maintained that the Macedonians, although Greek neither by origin nor language, had acquired the culture and religion of Greece. The author considers that the Macedonians form a class apart from any other races. Commerce in Macedonia is entirely in the hands of Greeks and Jews.

Poland Reborn. By Roy Devereux. London : Chapman and Hall, 1922. *Price* 15*s. net.*

Mrs. Devereux returned recently from a long journey through Poland, during which, she remarks, "in spite of the kindness and hospitality I received, my impression of the Poles, as a race, is that they are interesting and admirable rather than lovable." When the Great War opened, the Poles, out of sympathy for France and Britain, enrolled themselves in the army of the Czar, although Russia had been their cruellest oppressor. "To-day in the Polish Republic, as leaders of two conflicting currents in public opinion, Roman Dmowski and the present Chief of the State, Joseph Pilsudski, are the two men whose personalities stand out from a level where the average of intellectual, as opposed to moral, qualifications is extremely high." The probably more widely known Paderewski, who was the first Polish Prime Minister and an ardent patriot, did not succeed politically, as he "was not a statesman either by temperament or training." Discussing with a professor of the University of Warsaw the differences of character and temperament among the Poles, the author tells us that the professor compared the Galician (formerly Austrian) Poles to the English race, the inhabitants of Poznania (formerly Prussian Poland) to the Scottish race, and those of the Congress Kingdom (formerly Russian Poland) to the Irish race. The professor pungently added: "You have been striving after unity for a hundred and twenty years. We have scarcely had as many weeks."

With regard to Warsaw, the capital of Poland, the author says that compared to the Balkan cities she had just left, Warsaw struck her as frankly European and a model of order and cleanliness, excepting the Jewish Ghetto. As to the National Parliament at Warsaw, she remarks, "No less than twelve different groups exist in a Diet of 415 members, not counting a handful of Independents." The more important groups last summer were the "Populists," led by M. Witos the Prime Minister (84 members), the "National Democrats" (72), and "Constitutional Workers" (17); but there were also "National Workers" (28), "Christian Nationalists" (25), "Polish Socialists" (35), "Jews" (10), and "Germans" from Lodz (8). The Polish Parliament meets in a charming palace originally founded by the Russians as a school for daughters of the Polish

nobility. Mrs. Devereux has made a valuable contribution to our somewhat scanty knowledge of existing Poland, accompanied by excellent illustrations and a good clear map.

Switzerland, together with Chamonix and the Italian Lakes: Handbook for Travellers. By KARL BAEDEKER. 26th edition. Leipzig: Karl Baedeker. London: T. Fisher Unwin, 1922. *Price* 15*s.*

Despite the ever-present problem of the *valuta*, which tells so heavily against Switzerland as compared with the other areas treated of in this handbook, it may be said broadly that tourist traffic throughout is at least approaching pre-war proportions. A very large circle will therefore welcome this new edition, with its notes on present conditions. In Switzerland proper, perhaps the most notable change since the last edition is the account of Furka railway, as yet only open as far as the Rhone Glacier, but in process of completion to Andermatt.

Frequented Ways. By M. I. NEWBIGIN, D.Sc. London: Constable and Co., Ltd. 1922. With many Illustrations. *Price* 15*s.*

This is a remarkable book—a scientific study of scenery such as the editors of Baedeker and the Blue Guides never dreamed of; and it is very significant and appropriate that it should have been written by the editor of the *Scottish Geographical Magazine*. Those of us who have been responsible for the geography of Honours students in recent years, have heard them say again and again that they got more help and stimulus from hat magazine than from any of its contemporaries. No doubt, much was due to the generous support and practical wisdom of Dr. Bartholomew; but the evidence of the best students would suggest that still more was due to the editor herself in her own articles.

The book was evidently written before the war—an incidental advantage, and was not intended for the geographer proper; but it is to the geographer even more than the traveller that it will make the strongest appeal, and it may do much to make him a traveller. The standpoint, indeed, is that of one who realises what an extraordinary variety of geographical material, for study and illustration, is at the very doors of Western Europe. As Dr. Newbigin points out, a dweller in Montreal has to cross his continen to find, a dweller in Melbourne cannot find anywhere in his continent, examples of some of the most interesting geographical phenomena, *e.g.* glaciers and volcanoes, or fiords and young folded mountains; but a few hours' journey will provide us with all four. And she was fortunately tempted to use her full and expert knowledge to interpreting these phenomena for any one who is interested both in his own environment and in the interrelations of that and the life of Man.

The book is divided into two parts—(1) the General Characters of the Land, and (2) Some Typical Regions, corresponding roughly to Principles and their Application; but the two are very closely connected, *e.g.* the general characters being at once connected with the ways leading to the special regions. But the same spirit runs through both; in both the width and depth of knowledge are really extraordinary; and both seem to the present reviewer to be of almost unique value to students of geography. On some of the special regions, for instance, the reviewer has been lecturing for many years, and he has spent a great deal of time and trouble in studying them from as many standpoints as possible: but in literally every single case he found new facts, new suggestions, new interpretations,—not all acceptable to him, but all stimulating and provocative. And personally he asks for nothing more in any book. As would be expected from the

... admirable ... and in connection with this ... there is an abundance of vivid, picturesque, and often charming ... the coming of spring in the oakwood (p. 64), or the secrets of ... (p. 121). In the case of the last region, there is, as, indeed, to ... a critical paragraph of references; and the excellence ... numerous illustrations—all really illustrating the text, and the ... them the work of the author herself or her sister—increases the value of ... to the geographical student.

... it would be a disappointment in such a book to find *watershed* ... of *waterparting*; whatever the original meaning of the former, it is ... convenient to use the latter for the feature suggested by its present ... obvious meaning. It is not only, or even mainly, the presence of the plains ... for the fine growing of Lombardy (p. 146); and the comparison ... between butter and olive-oil (p. 150) ought to be—given the presence of lettuces ... of the oil not the latter.

The publication of a second edition should give an opportunity for correction of some misprints, *e.g.* "west" for "east" on p. 50, and "north-west" for "north-east" on p. 267; "remanants" on p. 71; and "finely" for "finally" on p. 262,—for the elimination of such atrocious, if popular, deformities as "France's", *e.g.* on p. 271,—and for a reduction of at least 50 per cent. in the number of times that the phrase "and so forth" is used.

L. W. Lyde.

... By Sir Frederick Treves, Bart. London: Cassell and Co., 1922. *Price 25s. net.*

The name Geneva is associated with some of the greatest intellectual movements. From Geneva, Calvin and Knox gave to the religious world a new Church, and Voltaire did his best to liberalise it and his worst to destroy it. J. J. Rousseau impregnated Europe with his ideas of Nature and Liberty. Gibbon gave to the world its greatest history. Necker tried to rescue France from the bankruptcy which plunged it into the Revolution. Madame de Staël persecuted Napoleon until he banished her. Byron sang of the lake in immortal strains. All these celebrated people resided on its shores and never failed to extol their attractiveness. Now we have the famous "Sergeant Surgeon to His Majesty the King" sending from Vevey in February 1922 a splendid volume with a good map and 100 excellent illustrations from his own photographs. He tells us that this book differs from any yet written, for, while previous books described only portions of the lake, "one" describes the Lake of Geneva as a whole."

He begins by reminding us that what we call the Lake of Geneva is the "Lac Leman" of the French, a term borrowed from the "Lacus Lemanus" of the Romans, and that "it stands at a height of 1220 feet above the level of the sea and its waters are blue." Deprived of water, "it would take the form of a vast terrific canyon, with sides of clammy and cadaverous stone and with a depth so profound ... its bottom would be almost in twilight, since, at its deepest, it sinks no less than 1035 feet. At one end of the valley the Rhone would pour in as an icy ...; while at the other end—like a cardboard toy on the top of a bank—would lie the city of Geneva." We feel thankful that nature has covered this ... with the loveliest veil of blue in the world.

The author of this well-written volume minutely describes the city of Geneva, ... with much spirit the historic story of "the Escalade," when in 1602 the Genevans repulsed a treacherous attack by Savoy. Proceeding to Evian, one of the most popular towns on the lake, he recalls Shelley's visit. Going on to the

three united towns of Territet, Montreux and Clarens, he says that they "command the finest view that the lake affords" and are always free from fog. "Clarens was made famous by J. J. Rousseau, for it was the home of the much enduring Julie." As to Vevey, Shelley wrote in 1816 that it was "a town more beautiful in its simplicity than any I have ever seen." Now it contains a population of 13,644. A specially interesting chapter is devoted to "Gibbon at Lausanne." He first entered it in 1753, an idle Oxford student, aged 16. He completed at Lausanne in 1787 his *Decline and Fall of the Roman Empire.* Voltaire also had a house at Lausanne, and when 64, met Gibbon, then aged 21. But Voltaire's celebrated residence was at Ferney, about 3½ miles to the north of Geneva. He had purchased an estate here in 1758, and the author graphically describes from Tallentyre's *Biography* his life there. We may add that Voltaire as *Seigneur de Village* is depicted in an entertaining volume by Fernand Caussy (Hachette, 1912). The great iconoclast even erected at Ferney a church with a tablet on its front inscribed "Deo erexit Voltaire," maintaining that it was the only church ever erected to God alone and not to a saint. Sir Frederick Treves gives an animated and most interesting account of all the places of historical interest, besides all the beauty spots of the Lake of Geneva, and has prepared an inspiring companion for every visitor to the most celebrated lake in the world.

A Book about Sweden. Published by the Swedish Traffic Association. Stockholm, 1922.

We have received this useful publication for many years in Swedish, but never before in English. This should ensure it a wider circulation. It is very well written and most attractively illustrated, and is accompanied by a fine orographical map of Sweden, giving the railway, water, and tourist routes. No tourist to Sweden should fail to provide himself with this very perfect guide, while economists should study it as showing what science can do to promote the prosperity of a country. "The Swedes belong to the Scandinavian offshoot of the Teutonic branch of the Aryan race, their number being estimated at nearly 8 millions. Of these, 1½ million are in the U.S.A. In Sweden itself there are about 6 million Swedes. There are practically no illiterates, and the general standard of development is very high. The primary school organisation of Sweden is probably one of the most efficient in the world." About 59 per cent. of the soil of Sweden is covered with forests, and 8 per cent. of the surface consists of lakes and rivers. "Numerous waterfalls and rapids make Sweden, from the point of water-power, one of the most important countries of the globe. The *water-power* is estimated to be 6,200,000 turbine horse-power, available during at least nine months of the year, corresponding to about 1050 horse-power per 1000 inhabitants (Norway 3020, Switzerland 382, Italy 152, France 147, Great Britain 11)." The Swedish output of iron ore amounted in a normal year to about 7,500,000 tons, whereof more than a million were refined in Sweden, while the remainder was exported. Swedish ore plays a conspicuous part in European steel production. The forest industries, however, represent the backbone of the economic life of Sweden, including the wood-pulp and paper industry. The engineering and electrical industries have made great progress. The Swedish match industry is one of the best known export industries on the world market. The production of objects of art is extremely flourishing, the finer Swedish porcelain having attained a very high level and found a large market abroad.

ASIA.

Chinese Mettle. By E. G. Kemp, F.R.S.G.S. With illustrations by the Author. London: Hodder and Stoughton, Ltd. *Price* 12*s.* 6*d. net.*

So many and so great are the changes which have taken place in China during the last two decades, and especially since the revolution of 1911 and the Great War with its many reactions in the Far East, that it would require a recent personal acquaintance with the country to enable one to form an adequate estimate of the value of Miss Kemp's report of her impressions formed in course of her most recent journey, which, we gather, was undertaken in 1920. Some of the chapters in this book have already appeared in a magazine, but the rest are new. The Chinese Minister at Washington, Mr. Alfred Sze, contributes a "prologue" in which he says that "since the days of Marco Polo scores of books describing China, both good and poor, have been written." Mr. Sze would have been nearer the mark had he said thousands, in place of scores, but, be this as it may, he classifies this and Miss Kemp's previous works as being "amongst the best ones," which is a fairly large claim. Miss Kemp is certainly an experienced traveller as well as a resourceful and plucky one, and has seen a good deal of the interior of China, far away from the beaten track, and her skill with the brush enables her to accompany her written sketches with a number of spirited drawings in colour. It will be remembered that members of the Royal Scottish Geographical Society were favoured with a view of the sketches in the Society's rooms, and that Miss Kemp also showed them on the screen at her lecture.

Miss Kemp has chosen as the title of her book, *Chinese Mettle*, and her theme is to show that China is steadily moving forward, despite her internecine warfare; also that the characteristics of the race are undergoing as great a change as the social fabric. This is undoubtedly true, but how far these changes are likely to affect the mass of the people remains a problem which only time can solve. It would also be correct to say of the great hinterland with its masses of toiling peasants that "the more this changes the more it remains the same." Miss Kemp states as her "rooted conviction that the future of the world depends largely on what happens in China during the next decade." This has been said before, and there is no question that, given an honest administration—which is yet to seek—and freedom from the arbitrary rule of the Tuchuns (military governors), the Chinese people, with their wonderful political gifts, are bound to play a leading part in the future of the Far East, and of the whole world. Miss Kemp draws attention repeatedly to the strong feeling of hostility existing on the part of the Chinese towards Japan and Japanese penetration; a feeling which probably was at its highest at the time of the boycott over the dispute about Shantung and the Japanese occupation of Kiaochau. She also notices the extensive cultivation of the opium poppy in Yunnan and Kweichow. It is a paying crop for officials and tax-gatherers, but a ruinous one for the country.

Miss Kemp devotes a special chapter to her visit to Taiyuanfu, the capital of Shansi, and to its enlightened governor Yen Hsi Shan, who appears to have succeeded in introducing the most sweeping reforms, showing what can be done in China. Another chapter of special interest is devoted to a visit to the head-quarters of General Feng Yu Hsiang at Changteh, in the province of Hunan, and to a description of the improvements which he had brought about in the city and amongst his soldiers. This Feng Yu Hsiang, it may be mentioned here, is "the Christian General" who has recently taken a prominent part in the fighting between Wu Pei Fu and Chang Tso Lin, and is said to have contributed largely to the recent defeat of the latter.

Miss Kemp's last journey extended to thirteen out of the eighteen provinces of China. Her many missionary friends in the interior helped her to get in touch with the Chinese officials and people, and also acted as interpreters. What she saw on her journey is best left to the reader to find out from a perusal of her book. We notice (p. 13) that she speaks of the "Hakka tribe." It would be more correct to say *people*, because the Hakkas—the name means strangers, or incomers, who are supposed to have come from the north to the south of China in ancient times and they speak a variant of the court dialect—are said to number about four millions. They inhabit the mountainous parts of Kwangtung, Kwangis, and Fukien, are hard-working and frugal, and are sometimes called *the Chinese Scots*!

Mysterious India. Its Rajahs — Its Brahmans — Its Fakirs. By Robert Chauvelot. Illustrated with 60 photographs. Translated by Eleanor Stimson Brooks. London: T. Werner Laurie, Ltd., 1921. *Price* 16*s. net.*

This is a series of sketches of life in India, seen through Latin glasses, and recorded in characteristic Latin fashion. It reminds one of looking through a high-powered microscope at a number of different objects, except that the objects themselves are not magnified nor do they show a multiplicity of detail. The author has a most abounding enthusiasm for India, and he has magnified his impressions to an extraordinary degree. The geographer, as such, will find little in this book, simply because impressions, as a rule, have small relation to actualities, but any one looking for entertainment will assuredly find it here. It would be better, however, to obtain the original, for the translation is too literal to be completely successful.

Kashmir in Sunlight and Shade. By C. E. Tyndale-Biscoe, M.A. (Cantab). London: Seeley, Service and Co., Ltd., 1921. *Price* 12*s.* 6*d. net.*

Mr. Tyndale-Biscoe's volume deals in a most fascinating manner with a most fascinating part of the Indian Empire. His intimate knowledge of the inhabitants leads the author to tell us much about them, and we could not have a more entertaining narrator nor a more enjoyable subject. His long stay as teacher has brought him into close touch with most aspects of native life, and his services to the people have shown him their strength and weakness. Gifted with a keen sense of humour, Mr. Tyndale-Biscoe lets us see these children of the mountains as he saw them, and between the lines we can read that his kindly sympathy, accompanying a forceful individuality, has borne good fruit among his pupils. He says little about himself, but the most casual reader must be struck with his high ideals and purposeful character. To these justice is done in Major-General Dunsterville's short introduction.

In the latter part of the volume the author deals more particularly with the physical side of education, and shows how he overcame prejudice and superstition to produce the healthy and clean body in which alone the healthy mind can function. The school motto, "In all things be men," is the goal towards which he strives, and he certainly leads the way.

The volume appeals strongly to all classes of readers, for while Mr. Tyndale-Biscoe deals most with the peoples of Kashmir and their education, he also gives excellent descriptions of the land and its scenery. The book is illustrated with thirty photographs and contains a sketch-map.

AFRICA.

The Wonderland of the Eastern Congo. By T. Alexander Barns, with an Introduction by Sir Harry Johnston, G.C.M.G. New York: G. P. Putnam's Sons, 1922. *Price* 31s. 6d.

"Having entered Africa by the east of the Zambesi delta we left it, after ten years, by the Congo estuary." With these words Mr. Barns concludes his most interesting account of his journey through the Eastern Congo. He was accompanied by his wife, and one of their objects was to collect specimens of insects and beasts, and also to take cinema and other photographs.

In May 1919, they left Elizabethville and went by train to Albertville on Lake Tanganyika. They crossed the lake in a steamer, and landed at Kigoma. From here they visited Ujiji, where, forty-nine years previously, Stanley met Livingstone. A good motor road now connects the two places. At Kigoma, their long "walk" began. Collecting and photographing as they went, they reached Niansa, in the country of the Wanindi, a tribe famous for its tall stature, honesty and truthfulness. The travellers were allowed to take a photograph of the Sultan's mother and wives, a unique privilege. From Kisenji on Lake Kivu, Mr. Barns made the ascent of Nimagongo, one of the volcanoes of the Virunga Mountains.

From Lake Kivu, the travellers passed through the little known districts of Ruchuru and Ruindi. At the former place they had a magnificent view of the volcanoes—"eight giants line across the landscape in imposing array." They crossed Lake Edward in a boat, and, from Mbeni, Mr. Barns ascended one of the Ruwenzori peaks. A heather fire broke out on the way, and the caravan had to run for its life. Shortly afterwards the party were nearly frozen with cold and had storms. Mr. Barns rejoined his wife at Mbeni, and they started again on their trek, and reached the Ituri forest, so rich in rare beasts and insects. A hunt for okapi was organised here with the help of the Pygmies. These little people are especially good in the thick woodland growth, and they can imitate the calls of wild animals in a wonderful manner. They are also most agile tree-climbers. Further on, there is a strip of country where Belgian rule is not yet fully organised. It is inhabited by the Wambuba tribe, and cannibalism is still rife. The travellers heard many gruesome tales. Their walk ended at Stanleyville, where they embarked on a steamer and glided down the Congo to the coast.

They had traversed about 3600 miles of country, collected 4300 specimens, and brought back a very fine gorilla skin, also an okapi. They also took many important and interesting photographs.

The book is very pleasantly written, and, without being in guide-book form, it would serve as such to any intending traveller. Mr. Barns' views on Belgian administration are also interesting. He pays a very high tribute to the work of the White Fathers.

Les Noirs de l'Afrique. Par Maurice Delafosse, ancien Gouverneur des Colonies, Professeur à l'Ecole Coloniale et à l'Ecole des Langues Orientales. Paris: Payot et Cie., 1922. *Price* 4 *fr.*

Monsieur Delafosse has written a useful little book on the black races in Africa. He traces their rise and origin from early times to the present day, and includes chapters on their social customs, and on their religions and beliefs. He concludes with a few notes on their intellectual and artistic qualities. These he thinks have never had a chance of development, as the majority of them were isolated for so long from civilisation, and also in earlier days they were often slaves.

The lack of any written history makes it difficult to determine where the black races originated, or what their early history may have been. Oral traditions and legends abound, but these are so embroidered by the Eastern imagination that it is hard to arrive at the truth.

The book is very short, but gives an excellent outline of the subject, and each chapter is furnished with a list of the authorities consulted.

Africa in the Making. By the Rev. H. D. Hooper. With Illustrations, Maps, and Bibliography. London: United Council for Missionary Education, 1922. *Price* 2*s. net.*

This is a thoughtful little book, compiled by a member of the Church Missionary Society, with a view to the presentation, in a condensed form, of some of the problems of African missionary life. It should be of use not only to missionaries, but also to administrative officers. Unfortunately, Mr. Hooper has omitted the most serious problem of all, viz., the rise of the native Ethiopian Church, with its huge and rapidly increasing membership, which is, from a missionary point of view, a much more serious menace to the existing societies than the teaching of Islam. For the Ethiopian Church has thrown over the control of the parent Churches, and follows a doctrine based on the patriarchal life as described in the Old Testament in preference to the higher life taught in the New; and, whilst not openly countenancing polygamy as yet, it at any rate tolerates it, and admits to baptism and church membership without preparation or inquiry. This is the most serious missionary problem of all. It is a matter for regret that it has been burked, and Mr. Hooper would be well advised to face it manfully when the next edition is produced. H. R. W.

AMERICA.

Between Two Continents. Notes from a Journey in Central America, 1920. By Prince William of Sweden. London: Eveleigh Nash and Grayson, 1922. *Price* 15*s. net.*

Prince William and friends sailed from Sweden in a splendid motor vessel, and landed in the formerly Swedish island of St. Barthelemy in the West Indies. The inhabitants still understand Swedish, but the island was ceded to France in 1877. While flourishing under the Swedes, it is now a picture of decay, neglect, and desolation. Passing Swan Island, our travellers found it possessed by the United Fruit Company, a big Boston firm. Early in February 1920 the Prince landed at Belize, the capital of the well-administered colony of British Honduras. Belize has 12,000 inhabitants, "an unattractive hotch-potch of whites, Indians, and negroes." The negroes are child-like and good-natured, the Indians are touchy and of violent temper. The Prince remarks: "It is likely that, before very long, the enormous resources and manifold possibilities of British Honduras will be better appreciated." Luxuriant fruit trees, valuable mahogany forests, and extensive pasturage await exploitation, but roads and railways must be supplied. Both goods and passengers are forwarded by the United Fruit Company already mentioned.

Prince William now applied himself to the main object of his expedition, the study of relics of the Mayas, a race which inhabited the Yucatan peninsula of Mexico from a century before Christ until their power was broken by the Spaniards in 1697. Hiring an American motor-boat at Belize, he sailed to the Mexican island of Cozumel, where he discovered the remains of a Maya city with typical

Maya buildings and pointed burial mounds. In one of the smaller temples the sacrificial altar was still standing. All the buildings were measured, sketched, and photographed, and plans and archæological material have been handed over to the ethnographical department of the Riks Museum, Stockholm. Prince William then sailed to Tulcoom, also on the Yucatan coast, and explored the ruins of the once great Maya city there. The Indians would not allow him to carry off specimens lest the spirits should be angered, but permitted him to measure and photograph the remains. The Indians here are a dwindling offshoot of the Maya race, and will die out ere long.

Hiring a schooner at Belize, the Prince sailed southward to Quirigua, and, catching malaria, lay in hospital three weeks. The hospital under Dr. MacPhail possesses the most modern equipment, and was built by the United Fruit Company. Prince William reached Guatemala city by train from Quirigua. He says, "Guatemala is naturally rich," producing sugar, coffee, spices, and cocoa in great quantities, with huge forests and fine agricultural districts. Gold, copper, tin and quicksilver also occur, but the only railways are one on the coast and a branch to Mexico. Guatemala is a republic in which civil wars have flourished at frequent intervals since it declared its independence in 1821. Prince William gives a masterly description of its population and administration. The President is omnipotent as long as he can crush opposition, but "a red trail of corruption" runs through the entire administration. In 1918 Guatemala city was shaken by the most violent earthquake in its recent history. Buildings of all sorts were hopelessly shattered and still lie in ruins. In the cemetery, 8000 dead were said to have been literally shaken out of their graves! The Prince went on to Antigua, the old Spanish capital, destroyed by an earthquake in 1773. He and his party left Guatemala after witnessing a revolution, and landed at Salvador, a neighbouring republic, but one in which they found order, industry, and progress —precisely the opposite of Guatemala. Salvador is, however, also visited by earthquakes, the last being in 1918 and 1919. Its population consists of Creoles, Indians, and negroes in every possible combination. At last our travellers reached Panama, and found a Swede as its harbour-master, while 3000 whites and 7000 blacks guarded the famous canal. They returned home by Jamaica and New York, having accomplished a voyage of great archæological interest and seen some of the best and worst governments of Central America.

Tramping with a Poet in the Rockies. By Stephen Graham, author of *A Tramp's Sketches*, etc. With 38 Emblems by Vernon Hill. London: Macmillan and Co., Ltd., 1922. *Price* 8*s.* 6*d. net.*

If we limit this review to quoting the title, with the addition that the book is discursive, elusive, ecstatic, and above all Stephen Grahamish, we have, we hope, done enough to send many a reader to it.

OCEANIA.

South Sea Reminiscences. By T. R. St.-Johnston, Colonial Secretary of the Leeward Islands, formerly District Commissioner in Fiji. Illustrated. London: T. Fisher Unwin, Ltd., 1922. *Price* 16*s. net.*

Mr. St.-Johnston has already written a serious work on the *Islanders of the Pacific*, noticed in vol. xxxvii., page 283 of this Magazine. The present volume may be regarded as a lighter companion. We do not believe, however, that the author could in any circumstances write in a heavy vein, and those who enjoyed his former book will eagerly welcome this. It makes no pretence to being any

more than what it is—a pleasant narrative with many entertaining digressions and excursions, of the author's experiences during a residence of several years in the South Seas. Nevertheless, the reader who cares to go below the surface will find much to correct, or, at the very least, to make more vivid, his own ideas of life in the Fiji Islands.

The Andaman Islanders: A Study in Social Anthropology. (Anthony Wilkin Studentship Research, 1906.) By A. R. Brown, M.A., formerly Fellow of Trinity College, Cambridge. Cambridge: At the University Press, 1922. *Price* 40*s. net.*

Yet another swiftly vanishing people has been caught and studied before it is too late. Mr. Brown resided in the Andaman Islands from 1906 to1908. His book was ready for publication in 1914, and the delay in its appearance is due to the war. It is abundantly evident that the author is a careful, diligent, and accomplished anthropologist, and there can be no doubt of the permanent value of his work. Apart from the recording of the customs and beliefs of a primitive people, the most interesting and the most important part of the volume is contained in Chapters v. and vi., where is given a new interpretation of these institutions. He says, p. 324: —"It should now, I hope, be evident that the ceremonial customs of the Andaman Islands form a closely connected system, and that we cannot understand their meaning if we only consider each one by itself, but must study the whole system to arrive at an interpretation. . . . We must substitute for the old method—the comparative method by which isolated customs from different social types were brought together and conclusions drawn from their similarity—a new method by which all the institutions of one society as social type are studied together so as to exhibit their intimate relations as parts of an organic system." Stated very briefly, and therefore imperfectly, the interpretation is this, that all customs, religious and magical beliefs, myths and legends are the result of the experience of men in society. This does not mean that these institutions originate consciously from that experience, but that they can be explained by reference to what the author calls their "social value." We have said enough, we think, to prove that this work is worthy of careful study, and that it marks what may be the beginning of a new stage in the development of anthropological science.

GENERAL.

The Coasts of Romance. By Crosbie Garstin. London: Wm. Heinemann. *Price* 7*s.* 6*d.*

To those who wish to see as much fun as possible made out of a tour to Morocco and Spain this book would be suitable. It is cleverly written and illustrated.

My Joy-Ride round the World. By Dorothy Dix. With 16 Illustrations from photographs. London: Mills and Boon, Ltd., 1922. *Price* 8*s.* 6*d. net.*

From our standpoint here this volume contains nothing that is new in the way of information, and little that is of value in the way of impressions, but it may serve to wile away an idle hour pleasantly enough.

People and Places: A Life in Five Continents. London: John Murray, 1922. *Price* 16*s.*

This book is a *pot-pourri* of anecdotes and sketches taken at random from the author's experiences and reminiscences. He has held official positions in Malay,

Several pages are devoted to London, and there are anecdotes of various [illegible] One of the most amusing incidents is the author's account of how he brought his Malay servants to England and what happened. The book is quite entertaining reading, but it has nothing new to add to geographical discovery.

The Ecology of the Sea-Shore. By F. W. Flattely and C. L. Walton, M.Sc. With an Introduction by Prof. J. A. Thomson, M.A., LL.D. London: Sidgwick and Jackson, 1922. *Price* 16*s. net.*

This interesting volume, with its beautiful series of plates, is, of course, [illegible] primarily for the zoologist. But it nevertheless contains much of interest to the geographer, both from the point of view of the correlations between organisms and the physical conditions, and from the economic side. For example, it is pointed out that in the tropics the tidal zone is poor in vegetation, as a rule, and often absolutely barren down to 1 metre below low-water mark. This is due to the killing of the spores and young plants by the intense heat. On the other hand calcareous algæ sometimes exist in large numbers; the presence of lime possibly, though this is not directly stated, having a protective effect. To cold algæ seem more resistant than to heat, but their northward extension is apparently limited by the fact that they may be destroyed by the attrition of floating ice.

A special chapter is devoted to the economic aspects of shore-life, but the subject is also discussed incidentally elsewhere. The story of the New England clams emphasises once again the familiar fact that not all the fecundity of nature can save a species from the effects of human greed and reckless exploitation. In certain parts of this coast the shellfish were once enormously abundant, but the beds have been largely destroyed. Pigs visit the sands and dig up the clams, and up to a quarter of a century ago it was customary to use them for fattening purposes. Further, in addition to the numbers used fresh in the vicinity of the beds, great numbers are canned and shipped away. Again, it is noted that in normal times the utilisation of seaweed for food, manure, etc., is mostly a sign of poverty, but during the war efforts were made in many areas to utilise this part of the harvest of the sea. Their significance in extracting from the sea-water some part at least of the organic waste which man pours so recklessly into the shore waters is shown by the work of several observers on the common sea-lettuce (*Ulva*). It is found that in polluted water this weed grows with rank luxuriance, and is capable of absorbing large quantities of ammonia. Under such conditions, as in Belfast Lough, it may become a positive nuisance.

A curious example of human migration associated with shore-animals is the southward penetration of Chinese fishers in search of the sea-cucumbers used in the preparation of trepang or bêche-de-mer. This search has brought them as far south as the north of Australia.

These are but a few examples culled at random from the book, and may serve to show the nature of its contents. There is a good bibliography.

EDUCATIONAL

Die Kartenwissenschaft. Erster Band. By Max Eckert. Berlin and Leipzig: Vereinigung Wissenschaftlicher Verleger, 1921.

The first thing to note about this work is the statement made in an enclosed leaflet as to the support given to its production by German business firms. A list of such supporters, including great industrial undertakings and associations connected with mining, metallurgical, electrical, and chemical industries, textile manufacturers, manufacturers of rolling stock and machinery, of mirror glass, porcelain, tobacco, chocolate, etc., besides several banks, is given, which, in view of the subject of the work, we cannot but consider remarkable as showing an attitude on the part of business men in Germany to scientific production to which it would not be possible to find a parallel in this country. The first volume of the work, extending to xvi+640 quarto pages, is characterised by a comprehensiveness and thoroughness worthy of the support given to its preparation. It is the fulfilment of a programme which the author laid before the 16th Deutscher Geographentag at Nuremberg in 1907, and has been brought out after the author had been enabled to make more or less prolonged studies in Göttingen, Hamburg, Kiel, Berlin, Dresden, Munich, Nuremberg, Gotha, Leipzig, Bonn, Duisburg, as well as in various libraries in Vienna, Paris (where he was even permitted to examine the cartographical material of the *Service Hydrographique*), London, Edinburgh, Amsterdam, Brussels, Copenhagen, Stockholm, Petrograd, and Moscow. This first volume is entirely devoted to general scientific considerations, including critical historical surveys. It contains only one map (opposite p. 588). The second volume, which is to be devoted to, or at least to include, the study of the map as applied to various purposes, will no doubt contain more illustrations of this nature. The present volume is made up of six great divisions dealing respectively with Cartography as Science, The Map Network, The Methods of Surveying, The Map in respect of its Horizontal Extent (*Die Landkarte und ihr Lageplan*), The Map as representing Superficial Configuration (*Die Landkarte und ihr Gelände*), and The Scientific Principles of the Representation of Superficial Configuration. Each of these is subdivided, and the greater subdivisions are again subdivided into headed sections of which there are 382 in all. We have ventured to describe the work as comprehensive, but this term should be qualified by reference to the point of view of the author. His historical survey makes no provision for the treatment of the well-known though extraordinary TO maps of the Middle Ages, or even for *portolani*, both of these, no doubt, being excluded in the author's view from the science of cartography. The author's treatment of the subject of projections will cause some surprise among those who are acquainted with the mathematical work done by the author on this subject elsewhere. In all that he has to say on the subject the mathematical foundation of the projections is kept very much in the background, the author in many cases seeming to assume that that is known to the reader. He makes indeed a marked and very proper distinction between the mathematician's and the geographer's point of view on the subject, though not always in terms that it is easy to understand, as, for example, in the passage printed on p. 179 in spaced lettering where he sets forth his view, of the supreme duty of the geographer in the study of the subject. The mathematically best, he tells us, is not necessarily the geographically best (p. 155; cp. also p. 157). But with all that he has said on the subject he still leaves as a desideratum an account of the really useful geographical projections indicating for each the actual proportion of error at different latitudes in receding from the fundamental lines of the map. Among the interesting historical notes on projec-

upon which he gives us is the fact that he saw "Mercator's" projection used for a map drawn in 1511 on the lid of a box containing a scientific instrument in the Germanic Museum at Nuremberg—fifty-eight years accordingly before a map on this projection was published by Mercator himself (p. 126). Mercator indeed, according to Eckert, "hardly devised any projection of his own," though in saying that Eckert considers that his fame as the first scientific cartographer in the dawn of a new time is in no way diminished. He holds that Mercator's true merit consists in having given currency to a number of little-known projections. Still one projection he does apparently consider to have been originated by Mercator, that already known by many other names (Sanson's, Flamsteed's, Sinusoidal, etc.). For this Eckert uses the name Mercator-Sanson on the ground that, while it was familiarised by Sanson, it was first used (for the map of South America) in Mercator's Atlas of 1606 (p. 125). The author is very confident in all his opinions. He considers the Germans to be far ahead of all the world in scientific cartography, and in this respect assigns a very low place to the English (pp. 89, 111, 116, etc.). On the other hand, he speaks in several places in high terms of the work turned out by the Edinburgh firm of Bartholomew, emphasising particularly their colour work (pp. 57-58) and the excellence of their lettering. "It is a pleasure," he says (p. 341), "to look at the maps which have proceeded from the great geographical institute of John Bartholomew at Edinburgh, also on account of the writing on them. In spite of the small size of the lettering of many of the names they can be read quite easily." This volume has no index. It may be hoped that this will be furnished in the second volume.

A General Course of Geography: Book I. First Year. By E. S. PRICE. London: G. Philip and Son, Ltd. *Price* 2*s.*

This book, the first of a series of four, contains useful exercises and questions dealing with the globe, maps, climate, vegetation, and South America, and should provide excellent scope for individual work. Useful connections between geography and other subjects are established by the introduction of exercises marked by certain letters. These form part of the course to which each letter refers, and should be worked before the purely geographical exercises which follow. Thus A, P, G, etc., indicate arithmetic, physics, and geometry respectively.

The author makes the suggestion that the English Course for the same year should include Prescott's *Conquest of Peru* and Bates's *Naturalist on the Amazon*—a suggestion, by the way, which might be followed up to advantage in many schools. For the teacher's benefit an appendix is added containing practical hints and a list of books for reference. The volume is illustrated by seventy-eight maps and diagrams.

A Manual of Seismology. By CHARLES DAVISON, Sc.D. Cambridge: The University Press, 1921. *Price* 21*s. net.*

Of recent years those whose interest in Seismology is more specialised have been better catered for in the matter of text-books than those for whom the subject forms part of such a more general science as geology. The present work, a member of the Cambridge Geological Series, aims at correcting this. Of its fourteen chapters five are largely geological, and all but perhaps two have a strong geographical interest. With its select bibliography to each chapter, copious references to recent literature, numerous clear illustrations, the book provides an excellent and not too mathematical introduction to Seismology. The only objections which can be taken to its catholicity are rather minor ones, relating to the

questions bearing on seismic foci treated in Chapter viii. It is well printed and well indexed ; but the cost of its 250 odd pages is a guinea !

Maps, their History, Characteristics, and Uses. By Sir Herbert George Fordham. Cambridge : The University Press, 1921. *Price 7s. 6d. net.*

This is an extremely interesting little book, dealing summarily (and all but exclusively) with maps from the historical and artistic point of view. It collects a quantity of information not easily available for the general reader, is well illustrated with reproductions of old maps, and generally well "got up." It suffers from two defects. There is a certain looseness of expression, especially in the latter half, a tendency to disconnection which is sometimes puzzling, and a want of due economy. Written for teachers, it suffers from the fact that the author does not seem to have been a teacher. Hence enthusiasm for the subject produces a want of balance in outlook, and leads to the enunciation as new of principles which are part of the ordinary body of pedagogics.

The Teaching of Geography. By M. E. and F. K. Branom. New York : Ginn and Co., 1921.

This new American volume by two lecturers in geography contains much that is of interest to teachers of geography in this country, for it emphasises many of the phases through which we have passed in the presentation of the subject. Geography appears to be coming into its own in the United States, and this book drives home the value of the subject in the world of affairs as well as its importance in the realm of culture. If American teachers are able to carry through the various model-building, problem-solving, open-air excursion, dramatising, and other schemes that the authors suggest, Geography must occupy a larger part of the school time-table than it does in our country.

There is danger in making all sorts of school lessons form part of the geography course. Scottish children knew their Bible best when they used it as a reading, spelling, geography, and history text-book, but they did not love it best. If geography be taught through all the other subjects of the curriculum, geography will suffer.

The authors point out how the late war led to great developments in the American teaching of geography. In our country a similar advance cannot be traced, for, of course, our best teachers (men and women) were taking part in the war, and the chaotic dislocation of Scottish school work is still evident.

Perhaps the greatest value of the treatise, so far as Scottish teachers are concerned, is the admirable summary it gives of methods that have been proposed, tried, adopted, or dropped by teachers here. The interest of the book is in showing how teachers in the United States are stimulating the teaching of a subject which has both vocational and cultural value.

Some of the tests given at the end of the volume are on sound lines, but the questions headed "Part III." (p. 280) are of doubtful value. If an answer is even partially suggested to school children they will guess—sometimes correctly ! Thus question 5, referring to an important highland of the United States, gives "much mining," "permanent snowfields," "herding industry important" among facts to be underlined if they apply. It is evident that the child is prompted and will underline as his memory or his fancy directs.

In the teaching of geography the globe and the map are the prime essentials. From these various names are memorised—frequently by printing them on outline maps. The revolt against the memorising of lists of names, to each of which a

detail location is applied, is nigh over, and teachers are recognising that without a mental stock of names, correctly related to globe and map, interpretive geography, by project or any other method, is of little real value. In the elementary school the memory is of greater importance than the reason; in the elementary school the child must obtain such a grasp of world distribution of geographical names—the great facts of continent and country, ocean and sea—as to allow him during the remaining years of his school career to interpret, co-ordinate, and systematise his memorised stock-in-trade. This need not be the be-all and end-all of the elementary stage, but it certainly is the backbone of the work there. In the higher stages the reasoning out of relations among globe, map, encyclopædia, and newspaper is the really educational desideratum.

Lehrmaterial zu 375 besprochenen Lichtbildern zur Länderkunde, herausgegeben von G. Becker, Chr. Kettler, und C. Uhlig. Three vols. Stuttgart: Theodor Benzinger, 1921. Prices in Great Britain and the Colonies (December 1921), Vols. I. and III. 1s. 6d.; Vol. II. 1s.

Teachers who read German will be greatly interested in these volumes. The fifty five plates which the volumes contain are made up of photographic reductions of lantern-slide subjects carefully chosen to illustrate the geography of all parts of the world. The first volume is devoted to countries outside of Europe, the second to Europe, exclusive of Germany and German-Austria, the third to these last two countries. That lantern-slides are indispensable in the teaching of geography has long been recognised. For all that they are a snare. To be effective in teaching they must not be presented merely as pictures, which, when rapidly shown one after the other, efface one another leaving no lasting effect, but must serve to illustrate what the teacher wishes to drive home at the particular points in his course at which they are introduced. A certain guarantee against this fault is given by the present selection, with the accompanying descriptions of each slide. The three teachers of geography, under whose general direction the slides have been selected and described, represent respectively the peoples' schools, the higher schools, and the universities, Dr. C. Uhlig being the professor of geography in the University of Tübingen. But a great many collaborators have contributed to the actual descriptions, all of them specialists in the department to which the described view belongs, and in most cases having actual knowledge of the scene described, many of the photographs being the work of those who describe them. The result is for the most part extremely satisfactory. Teachers making their own selection from the views illustrated will generally find all that they need, and it may be added not more than they need, for exposition. Still it can hardly be contended that this collection is wholly free from the fault which we have indicated as liable to result from the indiscreet use of lantern-slides. To show what we mean we will refer to one or two neighbouring examples in the third volume. The comments made on No. 902 ("A Loop of the Danube") and No. 900 ("*Das Schwarze Meer*", both on Plate 53, are appropriate and geographically instructive; but those on No. 890 ("The Artushof, Danzig"), Plate 52, while partly of the same character, contain particulars more suitable for a guide-book—interesting to people on the spot, but not geographically significant. Then take No. 906 ("Vienna"), Plate 53, a view showing merely a panorama of the city as seen from the Rathaus, not giving even a hint that the city is situated on any river. The corresponding text gives a very good account of the geographical importance of the situation of Vienna, an account, however, which is not illustrated by this view, requires indeed map-illustration, both by means of large-scale and small-scale maps, supplemented, it may be, by a pictorial illustration of a different

kind. In the view of the present writer the commentary on a slide used in teaching should be confined to what the slide shows. The price of individual slides in December 1921 was 9d., for the whole series of 362 slides of regions outside of Europe £11, 10s., the 201 of Europe £6, 10s., the 375 of Germany and German-Austria £11, 10s. Teachers wishing to order them should remember that a carrier suitable to slides of the continental size and shape will be required. G. G. C.

Human Geography. Book I. Peoples and Countries; Book II. Regions and Trade. By J. Russell Smith, Ph.D. Philadelphia: John C. Winston Company.

This well-written, well-illustrated book, as the title indicates, definitely makes man the centre of geography. The author says in his preface that we are all interested in geologic processes, but often all our interest is in the results of the process on man's affairs. Therefore the point of approach is through people, not rocks. The volumes contain many maps, photographs, and diagrams, and are primarily intended for the use of children in the United States; in consequence, the sections on North America take up a very large amount of space.

There are some errors in the section on the United Kingdom in Book I., *e.g.* "Most farmhouses of the British Isles have thatched roofs" (p. 223).

Geography for Senior Classes. By E. Marsden and T. Alford Smith. Pp. x + 521. Illustrated. London: Macmillan and Co., Ltd., 1921. *Price* 7*s.* 6*d.*

This text-book, the third of a series, is intended for use in secondary schools. Part I. deals with World Geography, and the other four parts handle the separate continents more or less fully. Numerous exercises are given.

The book calls for no special comment, but if a reprint is required note might be made of the following. On page 279 the height of Mt. Everest is given as 29,140 ft., while on page 344 the height given is 29,002 ft. The "Daily Weather Chart" isobars are now plotted at intervals of two millibars; the fig. on page 181 would have been useful for purposes of comparison if accompanied by a modern chart. In September 1921 Guatemala, Salvador, and Honduras signed an agreement (which became effective on 1st October 1921) whereby they constituted themselves the Republic of Central America. No mention is made of this.

Nineteenth-Century Europe and Britain. By C. Raymond Beazley, D.Litt., Professor of Modern History, University of Birmingham. London and Glasgow: Collins' Clear-Type Press. *Price* 3*s.* 6*d.*

This admirable little book is of course primarily historical, but it is needless now to insist on the vital relations between geography and history, and the volume cannot be too strongly recommended to teachers of geography. The period embraced by it is from the fall of the Napoleonic Empire (1812-15) to the World War of 1914-18, a period comprising a great deal of rearrangement in political geography, the processes of which are set forth with masterly conciseness and clearness. For geographers, as well as politicians, there is perhaps nothing more instructive than the instances given of unintended and unforeseen results of political moves. While, for example, "the obvious and expected consequences" of the Crimean War are summed up as disillusion, "the Great Power which ultimately gained most from this cycle of events was the one which stood wholly apart from the struggle . . . in other words, the Bismarckian Empire, the new German unity under Prussian leadership, was the chief, the most astonishing, and to some the most unwelcome result of the Crimean War, and of the new international conditions that war produced" (p. 94). Elsewhere (p. 120) the author mentions another

[illegible] result, the extension of Russian power by Muravev (Mouravieff to the Pacific and beyond the Amur—the first expansion of Russia at the expense of China, it may be added, since the treaty of Nerchinsk in 1689. Professor Beazley mentions that for some time past the special subject of his studies and interest has been the Bismarckian age and its sequel. Of the fruit of these studies many examples might be given in pregnant sayings of Bismarck himself showing the remarkable circumspection and foresight of that statesman. But for these there is no room here. The reader must be referred to the book itself. Besides interesting notes on "culture-history" at the end of most of the chapters the volume is furnished with a considerable bibliography and an index. G. G. C.

BOOKS RECEIVED.

The Conquest of the New Zealand Alps. By SAMUEL TURNER, F.R.G.S. Illustrated. 8vo. Pp. 291. London: T. Fisher Unwin, Ltd., 1922. *Price* 21*s.*

Some Molluscs from Nigeria. Bul. No. 3. By R. BULLEN NEWTON, I.S.O., F.G.S. *Geological Survey of Nigeria.* 8vo. Pp. 148. The Nigerian Government. *Price* 17*s.* 6*d. net.*

Nouvelle Géographie Universelle. Par ERNEST GRANGER. 4me partie. Paris: Librairie Hachette, 1922. *Prix* 10 *francs.*

India in Pictures. By CLIVE BARNARD, M.A., B.Litt. 8vo. Pp. 64. London: A. and C. Black, Ltd., 1922. *Price* 3*s.* 6*d.*

Children of the World. Visual Geography. By AGNES NIGHTINGALE. 8vo. Pp. 48. London: A. and C. Black, Ltd., 1922. *Price* 1*s.*

A Book about Sweden. Published by the Swedish Traffic Association. 8vo. Pp. 184. Stockholm, 1922.

Edinburgh. Described by JOHN GEDDIE. Painted by E. W. HASLEHURST, R.B.A. 8vo. Pp. 68. London: Blackie and Son, Ltd., 1922. *Price* 3*s.*

The Climates of the Continents. By W. G. KENDREW, M.A. 8vo. Pp. xvi + 387. Oxford: Clarendon Press, 1922. *Price* 21*s. net.*

L'Industrie du Fer en France. Par J. LEVAINVILLE. 8vo. Pp. 211. Paris: Librairie Armand Colin, 1922. *Prix* 5 *fr.*

Edina Geographies. Book V.: North America. Pp. 64. *Price* 1*s. Book VI.: Physical Geography.* Pp. 96. *Price* 1*s.* 6*d.* By THOMAS FRANKLIN. Edinburgh: W. and A. K. Johnston, Ltd., 1922.

Regional Work: A General Survey of the Land Forms, Climates and Vegetation of Western Europe, considered in their Relation to the Life of Man; including a detailed Study of some Typical Regions. By MARION I. NEWBIGIN, D.Sc. (Lond.), F.R.G.S. With Illustrations from photographs, sketch-maps and figures. 8vo. Pp. xi + 321. London: Constable and Co., Ltd., 1922. *Price* 15*s.*

De Zeeën van Nederlandsch Oost-India. 8vo. Pp. 506. Koninklijk Nederlandsch Aardrijkskundig Genootschap. Leiden, 1922.

Encyclopaedie van Nederlandsch-Indie. Onder Redactie van D. G. STIBBE. Aanvullingen en Wijzigingen. Part I. Pp. 32. Leiden: E. J. Brill, 1922.

Nineteenth-Century Europe and Britain. By C. RAYMOND BEAZLEY, D.Litt., F.R.G.S. 8vo. Pp. 344. Glasgow: Collins, 1922. *Price* 3*s.* 6*d.*

Britain as a European Power. By ANDREW BROWNING, M.A. 8vo. Pp. 304. Glasgow: Collins, 1922. *Price* 3*s.* 6*d. net.*

Industrial and Commercial Geography, with Special Reference to the British Empire. By ARTHUR RAYFORD, B.Sc. (Econ.). 8vo. Pp. 294. Glasgow: Collins, 1922. *Price* 3*s.* 6*d. net.*

La Terre et L'Evolution Humaine: Introduction Géographique à l'Histoire. Par LUCIEN FEBVRE, avec le Concours de LIONEL BATAILLON. 8vo. Pp. xxvi + 471. Paris: La Renaissance du Livre, 1922. *Prix* 15 *fr.*

The Blue Guides: Wales. Edited by FINDLAY MUIRHEAD, M.A., F.R.G.S. 22 maps and plans. 8vo. Pp. lvi + 260. London: Macmillan and Co., Ltd., 1922. *Price 7s. 6d. net.*

Colonial Reports (Annual).—Uganda (1112); Mauritius (1115); Jamaica (1116); Cyprus (1117); Weihaiwei (1118); Gold Coast (1119); Gambia (1120). London, 1922.

A Naturalist in the Great Lakes Region. By ELLIOT R. DOWNING. 8vo. Pp. xxv + 328. Chicago: University Press, 1922. *Price* $3.50.

Loch Lomond, Loch Katrine, and the Trossachs. Described by GEORGE EYRE-TODD. Painted by E. W. HASLEHURST, R.B.A. 8vo. Pp. 67. Glasgow: Blackie and Son, Ltd., 1922. *Price 3s. net.*

Essays on the Depopulation of Melanesia. Edited by W. H. R. RIVERS, M.D., with a Preface by Sir EVERARD IM THURN, K.C.M.G. 8vo. Pp. xviii + 116. Cambridge: University Press, 1922. *Price 5s.*

The Wonderland of the Eastern Congo: The Region of the Snow-Crowned Volcanoes, the Pygmies, the Giant Gorilla, and the Okapi. By T. ALEXANDER BARNS, F.R.G.S., F.Z.S., with an Introduction by Sir H. H. JOHNSTON, G.C.M.G., K.C.B. Super Royal. Pp. 288. London: G. P. Putnam's Sons, Ltd., 1922. *Price 31s. 6d. net.*

The New Zambesi Trail: A Record of Two Journeys in N.W. Rhodesia (1903 and 1920). By C. W. MACKINTOSH. Illustrated. 8vo. Pp. 370. London: Marshall Bros., Ltd., 1922. *Price 10s. 6d.*

Persia. By Brigadier-General Sir PERCY SYKES, K.C.I.E., C.B., C.M.G. 8vo. Pp. 188. Oxford: Clarendon Press, 1922. *Price 7s. 6d. net.*

History of Switzerland, 1499-1914. By WILHELM OECHSLI. Translated from the German by EDEN and CEDAR PAUL. 8vo. Pp. xiii + 480. Cambridge: University Press, 1922. *Price 20s. net.*

The Conquest of New Granada: Being the Life of Gonzalo Jimenez de Quesada. By R. B. CUNNINGHAME GRAHAM. 8vo. Pp. 272. London: William Heinemann, 1922. *Price 15s.*

The Czecho-Slovak Republic: A Survey of its History and Geography: its Political and Cultural Organisation, and its Economic Resources. By JAROSLAV CISAR and F. POLORNY. 8vo. Pp. iv + 218. London: T. Fisher Unwin, Ltd., 1922. *Price 9s.*

The Blue Guides: North-Eastern France. Edited by FINDLAY MUIRHEAD and MARCEL MONMARCHE. 55 maps and plans. 8vo. Pp. lxvi + 351. London: Macmillan and Co., Ltd., 1922. *Price 10s. net.*

Helps for Students of History: Some Aspects of Boundary Settlement at the Peace Conference. By ALAN G. OGILVIE, O.B.E., M.A., B.Sc. 8vo. Pp. 32. London: S.P.C.K., 1922. *Price 6d.*

Evolution of the Essex Rivers and of the Lower Thames. By J. W. GREGORY, D.S.C., F.R.S. 10 Illustrations. 8vo. Pp. 68. Colchester: Benham and Co., Ltd., 1922. *Price 2s. 6d. net.*

The New Zealand Official Year Book, 1921-22. Wellington, N.Z. *Price 7s. 6d.*

The Second Geodetic Levelling of England and Wales, 1912-1921. By Sir CHARLES CLOSE, K.B.E., C.B. Pp. 62. Southampton, 1921. *Price 17s. 6d.*

The Heart of Arabia: A Record of Travel and Exploration. By H. St. J. B. PHILBY, C.I.E., I.C.S., F.R.G.S. In 2 volumes. Illustrated. Pp. xxiii + 386. Vol. II. vi + 354. London: Constable and Co., Ltd., 1922. *Price 63s.*

Anthropogeographie von Brasilien. Von Dr. B. Brandt. 8vo. Pp. 112. Stuttgart: Verl. J. Engelhorns Nachf, 1922.

British North Borneo: An Account of its History, Resources, and Native Tribes. By Owen Rutter, F.R.G.S. 8vo. Pp. xvi + 404. London: Constable and Co., Ltd., 1922. *Price* 21*s.*

Silent Highways of the Jungle: being the Record of an Adventurous Journey across Peru to the Amazon. By G. M. Dyott, F.R.G.S. 8vo. Pp. 320. London: Chapman and Dodd, Ltd., 1922. *Price* 25*s.*

Begriff, Stellung und Einteilung der Geographie. Von Dr. Albert Leuteneggers. 8vo. Pp. 157. Gotha: Justus Perthes, 1922. 4.50 *fr.*

The Story of Leith. By John Russell. Cr. 8vo. Pp. 472. Edinburgh: T. Nelson and Sons, Ltd., 1922. *Price* 6*s.*

Junior Regional Geographies. By W. H. Barker, B.Sc., and Leonard Brooks, M.A. Book I. Pp. 112. The Peoples of the World. London: University Press, Ltd., 1922. *Price* 1*s.* 9*d.*

The Lhota Nagas. By J. P. Mills, I.C.S. With an Introduction by J. H. Hutton, C.I.E. 8vo. Pp. x + 255. London: Macmillan and Co., Ltd., 1922. *Price* 25*s.*

The Scott Country. Described by John Geddie. Painted by E. W. Haslehurst, R.B.A. 8vo. Pp. 67. London: Blackie and Son, Ltd., 1922. *Price* 3*s.*

The Making of Australasia: A Brief History of the Origin and Development of the British Dominions in the South Pacific. By Thomas Dunbabin, B.A. Demy 8vo. Pp. ix + 258. London: A. and C. Black, Ltd., 1922. *Price* 10*s.* 6*d.*

Colonial Reports (Annual).—Gambia (1121); Colony and Protectorate of Kenya (1122); British Guiana (1123); Grenada (1124); Zanzibar (1125); Northern Territories of the Gold Coast (1126); Gibraltar (1127).

Annual Statement of the Trade of the U.K. with Foreign Countries, 1921. Vol. I. London: 1922. *Price* 12*s.*

Under the Acrocerannian Mountains. By Henry Baerlein. 8vo. Pp. 164. London: Leonard Parsons, 1922. *Price* 6*s.*

The British Isles of To-day. By J. F. Unstead, M.A., D.Sc. 8vo. Pp. 184. London: Sidgwick and Jackson, Ltd., 1922. *Price* 3*s.*

A Geography of Imperial Defence. By Vaughan Cornish, D.Sc. With maps. 8vo. Pp. viii + 154. London: Sifton, Praed and Co., Ltd., 1922. *Price* 6*s.* 6*d.*

The Discovery of Australia. By G. Arnold Wood, B.A. Illustrated. 8vo. Pp. xi + 541. London: Macmillan and Co., Ltd., 1922. *Price* 25*s.*

Arctic Sport and Wastes: Wild Life on the Spitsbergen Archipelago. By Seton Gordon, F.Z.S. With two maps and 114 illustrations. 8vo. Pp. xiv + 206. London: Cassell and Co., Ltd., 1922. *Price* 15*s.*

From Switzerland to the Mediterranean on Foot. By J. B. Winter. 8vo. Pp. 124. London: T. Werner Laurie, Ltd., 1922. *Price* 5*s.*

Six Years in Bolivia: The Adventures of a Mining Engineer. By A. V. L. Gribble. Illustrated. 8vo. Pp. 243. London: T. Fisher Unwin, Ltd., 1922. *Price* 21*s.*

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Teacher Associate Membership.—With the object of helping to promote the teaching of Geography in Schools, "Teacher Associates" are admitted to certain privileges of the Society at a reduced Subscription of Fifteen Shillings. The privileges are limited to the use of the Society's Rooms, receipt of the magazine, the right to borrow one volume from the Library, and one ticket (not transferable and admitting only one) for the Society's meetings. Only professional teachers are eligible for election, and the applicants must state the name of the school at which they are engaged.

Student Associates.—Students attending Scottish Universities are also admitted to the same privileges of the Society on the same terms.

Branches of the Society have been established in Glasgow, Dundee, and Aberdeen, where periodical Meetings are held.

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THE SCOTTISH GEOGRAPHICAL MAGAZINE.

THE ISOTHERMAL FRONTIER OF ANCIENT CITIES.[1]

By Vaughan Cornish, D.Sc., F.R.G.S.

The northern frontier of the Roman Empire is shown in our atlases of Ancient Geography, and also that of the Achæmenian Empire of the Persians and of the dynasties which succeeded in the Middle East. The frontier of the ancient Chinese Empire has not been made similarly familiar to us, and in place of it we have grown accustomed to the representation of the Empire of China as it has been in mediæval and modern times. From this most of Manchuria, all Mongolia, and the Ili Valley must be shorn off in order to get the Chinese northern frontier as it was under the Han dynasty in the beginning of the second century after Christ, the age of the Antonines in Europe. At this time, when the ancient civilization of Eurasia was at the height of its culture and apparently at the maximum of its power, part of the northern frontier, once controlled by the Achæmenidæ, was divided between the Parthians, capitalled at Ctesiphon, and the Kushan dynasty of the Yue-chi, capitalled at Peshawar. These four northern frontiers, Roman, Parthian, Kushan, and Chinese, were consecutive, forming an unbroken line from the mouth of the Rhine near the modern Katwyk in Holland, 52° N., to the east coast of Korea in about 41° N. South of the line a vast array of established cities stretched for seven thousand miles across Eurasia, in some parts protected by natural barriers, in others defended by lines of masonry fortification. North of the line were the tents of nomads, huts of forest dwellers, and stockaded defences of earth and wood. In the northern part of modern Germany there were territories north of the line which the Romans had abandoned as untenable or unprofitable. South of the line in eastern Europe was the district of Dacia, which Augustus pre-

[1] A paper read to Section E (Geography) at the Hull Meeting of the British Association.

[illegible] the native people had in the interval begun to construct masonry fortifications.

I have to bring before the Section the remarkable fact, which I discovered in the course of my investigation of the geography of capital cities, and which, so far as I am aware, no one else has discovered, that *the northern frontier of ancient cities on the eve of the barbarian irruption has, within narrow limits of variation, the same average temperature throughout.* It is a true annual isotherm, not an isotherm reduced to sea-level. Along the European part is a line of modern cities with meteorological observatories. The annual temperature of eight of these, strung out along the length, has an average of 48·6° Fahrenheit (Table I.) In Asia we are not well off for meteorological records near the line on the south, and Table II. consists of a list of towns, mostly

TABLE I.

Mean Annual Temperatures in Degrees Fahrenheit, along the Frontier in Europe.

[illegible]	47·8°
Utrecht	47·8°
Cologne	50·2°
Ratisbon . . .	46·6°
Vienna .	48·8°
Hush Pesth .	49·8°
Belgrade .	49·3°
[illegible]	48·5°
Mean .	48·6°

TABLE II.

Mean Annual Temperatures in Degrees Fahrenheit, north of the Frontier in Asia.

Stavropol . . .	47°
Astrachan . . .	50°
Kazalinsk . . .	46·5°
Aulieata . . .	51·5°
Narynsk . . .	44°
Vernyi . . .	46·5°
Kuldja	48·5°
Mukden . . .	45°
Mean	47·4°

under Russian rule, just north of the line, where proper records have been kept. It will be observed, therefore, that their temperatures are rather lower than that along the frontier of the ancient cities. The average temperature of these eight towns north of the line is 47·4° Fahrenheit. A very long gap in these towns occurs between Kuldja and Mukden, but the record for the Lokchun depression in Chinese Turkestan, a little south of the frontier, yields a not inconsistent figure, if corrected for the general height of the surrounding country, and that of Peking is not discordant. Farther east the generalized isotherm of 48·5° Fahrenheit, as shown on our atlases, reaches the eastern coast of Korea in about 41° N. (somewhat north of the peninsular portion of the country), which cannot be very far from the frontier of its ancient cities.

In the detached Roman possession of Britain the inner and principal line of fortification had its western terminal at Carlisle, where the temperature is 47·8° Fahrenheit. Eastwards of the continent of Eurasia the conquest of the Japanese islands by their present masters was only completed at a much later date than that with which we are dealing, but

the Japanese derived their culture from ancient China (mainly through Korea), and it may therefore be significant that they were content to conquer, without colonizing, Yezo, the northern island, and that what is reckoned by the Japanese as Japan proper, and is called by them "Old Japan," does not include Yezo but stops short with Honshiu, the mainland, and that the annual isotherm of 48·5° Fahrenheit traverses the Strait of Tsugaru, which separates Old Japan from Yezo.

The historical evidence for the position of the frontier of ancient cities at the time selected is given for the less-known sections in my forthcoming book *A Geography of the Great Capitals*. The fact that the annual temperature along this immense line only varies within remarkably narrow limits cannot be reasonably contested. If it be the case that desiccation has occurred generally in Asia along the line since the second century of our era, its probable effect would, I presume, be to lessen the winter and raise the summer temperature, leaving the annual temperature much the same.

The coincidence of frontier and true isotherm is not a mere consequence of east and west barriers of mountains, inland seas, and rivers, for these had to be supplemented by long lines of fortification. Neither was it due to unsuitability of the southern country to pastoral peoples, for in Asia there was much-coveted grazing land south of the settled frontier. Precisely how far the coincidence which I have established is significant it is difficult to say. There is, however, at least one fact recorded in our maps which shows that the total amount of heat received from the sun throughout the year can be a controlling condition in spite of great variations in the range of temperature and in rainfall. The northern limit of the present economic cultivation of the vine is nearly an isothermal line across Eurasia, and does not differ very greatly from the northern limit of ancient cities, except that it runs north of the Caucasus and on the other hand does not reach the Low Countries, northernmost France, and Great Britain. The latter fact, however, is simply a consequence of modern conditions, including cheap transport. The Romans cultivated the vine for wine-making both in Belgium and Britain, and did not colonize countries where it would not grow. In this connection their abandonment of the land beyond the lower Rhine and their late advance into and colonization of Dacia is particularly suggestive.

AFFORESTATION IN KOREA.

By Professor Percy M. Roxby.

(*With Illustrations.*)

While passing through Korea last year *en route* to China I was able to collect some interesting information about the wonderful afforestation scheme which the Japanese authorities are carrying out in that beautiful but long-neglected country. It is probably the most systematic and

ambitious effort at afforestation on a national scale which has so far been attempted, and is not without its lessons for this country. A singularly favourable opportunity for State enterprise was presented by the fact that the Japanese Government, succeeding to the Crown Lands of the Korean Royal House on the annexation of the country in 1910, came into possession of about seven-eighths of the total area of "Hills and Mountains"—14,000,000 out of an estimated total of 16,000,000 *cho*[1]), which constitute the greater part of the land surface of Korea. This opportunity was eagerly seized by the new Administration, bent on the

FIG. 1.—A Government Forest Nursery near Seoul (Kei-jo).

rapid economic development of the country, since afforestation was held to be a preliminary to both agricultural and industrial progress. Originally the granitic highlands of Korea were fairly densely wooded, but over the greater part of the country the natural forests have been almost totally destroyed, with results disastrous to both agriculture and pasturage. The only large area of primitive forest remaining is in the north-east, a portion of the rich belt of mixed woodlands which occupies the basin of the Upper Yalu, and stretches northwards towards the Amur. On the Manchurian side of the border much reckless destruction of this important forest is taking place, but its exploitation on the

1 A *cho* is equal to 2·45 acres approximately.

Korean side is being carefully regulated. The Government have maintained a large lumber station (at Shingishū) which controls the use of the forest. The working principle at the present time is to cut down 1 120th of the forest each year and to replant to the same extent.

Meanwhile, the re-afforestation of the denuded highlands of central and southern Korea has begun in real earnest, and I was much impressed by the great progress which has been made since 1913 when I first travelled through the peninsula. About 250,000 *cho* have already been planted, one half directly by Government and the other by private

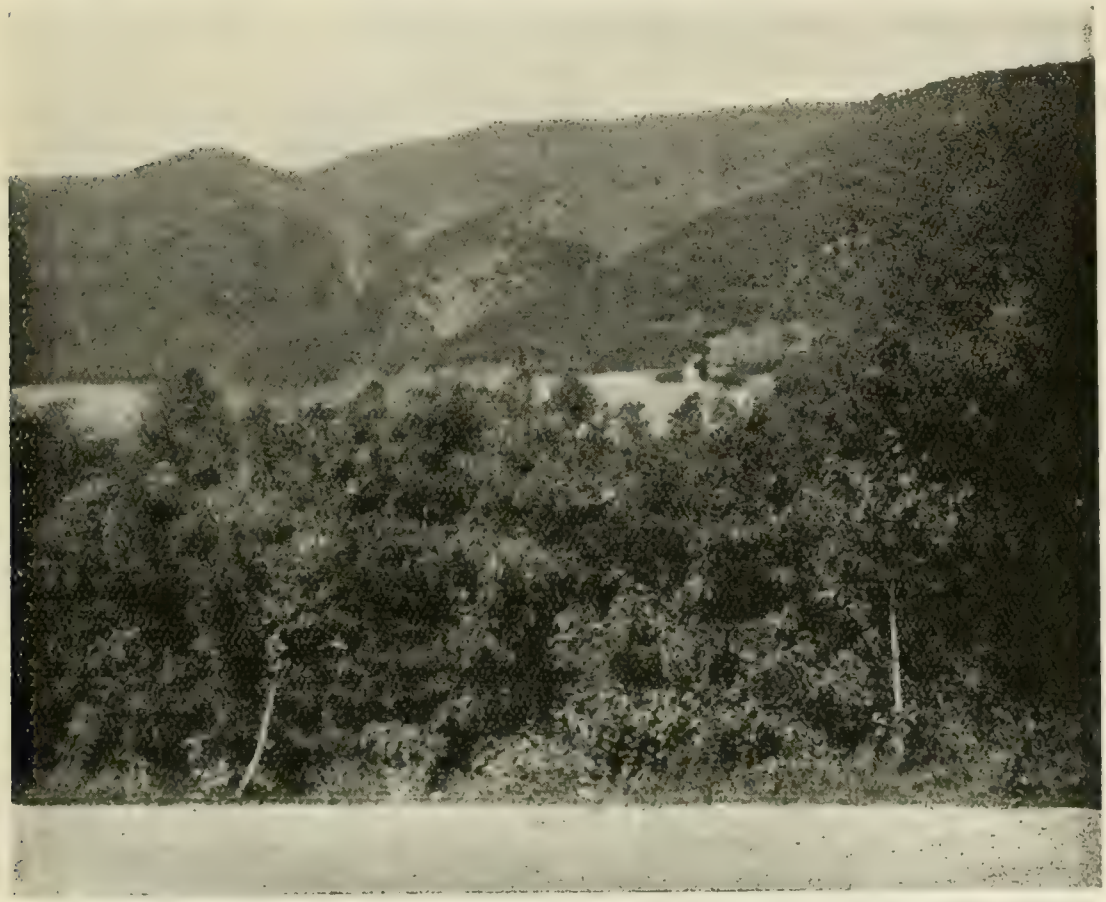

FIG. 2.—Afforested Lands in Korea, showing pine plantations on the hills, and acacias, poplars, etc., in the valley.

individuals to whom the land is rented on the express understanding that planting shall be the first consideration. At the end of ten years the land will pass to the individuals concerned, provided that the Administration is satisfied with its forestal use in their hands. At present about 150,000,000 seedlings per year are being planted, at the rate of about 3000 to 5000 per *cho*.

Fig. 1 shows a typical Government nursery not far from the capital, Seoul (or Kei-jo, as it is now officially called), where these seedlings are raised. On the hills the trees planted are mainly Korean pines of the two- and five-leaved varieties. They come to maturity in about forty years and are from 50 to 60 feet in height. The chief difficulty is to

present deprivations by the peasantry for purposes of fuel, and so, to prevent destruction of the hill forests, acacias, Lombardy poplars, and other quick-growing trees are now being extensively planted on waste places in the lowlands and valleys for local use. Fig. 2 shows a typical Korean landscape, illustrating both kinds of planting. According to the officials concerned with the scheme, it is the intention of the Government to retain as State forest about six million *cho* of the large area at present under their administration, and to allow the other eight millions to pass into private hands on the conditions specified above.

The results anticipated by the Japanese forestry experts from this scheme, apart from the supply of timber essential to the development of many Korean industries, are as follows :—

1. Modifications of climate : (*a*) value of trees as wind-screens ; (*b*) tendency to increase equability of temperature ; (*c*) probably a slightly increased rainfall, since the bare granite rocks when heated tend to check condensation.
2. The prevention or at least reduction of both floods and droughts by checking the rapid run-off of water from the hills. This of itself will be an immense gain to agriculture, but in addition it should be noticed that
3. Afforestation is considered a necessary preliminary to the extensive irrigation schemes by which it is hoped to increase the agricultural area of the country. These depend upon the construction of irrigation reservoirs, which at present it is almost useless to make owing to their being quickly silted up by the torrential run-off of water.
4. The development of cattle and sheep pasture.
5. The preservation and improvement of the valued supply of fish in the rivers and estuaries through the more even flow of water.
6. It is also interesting to notice that the Japanese attach importance to the improvement of health through pine forests, both by their effect on the purification of the air and by the enhanced beauty which they give to the landscape.

The cost to the Government of this big scheme, including the upkeep of the lumber station in the north, is estimated at about yen 3,500,000 per year.

To encourage popular interest in afforestation, Arbor Day (significantly fixed on 3rd April, the conventional anniversary of the death of the famous Jimmu Tenno, the first Emperor of Japan) has been made a national institution.

The afforestation of Korea has, of course, a high significance for China, which is faced with the same problems due to the destruction of her forests, but on a far more gigantic scale.

SOME GEOGRAPHICAL ASPECTS OF WATER-POWER DEVELOPMENT IN RECENT YEARS.[1]

By Captain H. M. Spink, M.C., M.A., B.Sc.

(With Sketch-Maps and Illustrations.)

The question of the development of water-powers is one which is apt to be lost sight of in this country, and in all probability few people are aware of the great advance which has taken place abroad. Our own industrial progress is so largely based upon coal that we are often forgetful of the possibility of industrial development in regions which have hitherto been handicapped by its absence. The great use made of hydro-electrical power in Sweden, in Norway, in North America, and in Italy—to take a few cases in point—has not aroused the attention here which might have been expected. It may, however, be forced unpleasantly upon our notice when, for example, the loss of Italy as a coal market becomes one of the first-fruits of Italy's determined exploitation of a valuable national resource.

The fact that data relating to water-powers are still confined to somewhat dull State documents not readily accessible to the ordinary person may perhaps partly account for the general lack of interest in the subject. But the increasing literature on the subject of water-power, even although it is mostly in the form of departmental reports, well deserves notice, for these reports often contain matter to stir the imagination. Is there not romance indeed in the harnessing of the waterfall and the stream to the service of mankind, or in the invasion of mountain solitudes by the hum of the turbine? The U.S. Government has published Part II. of an atlas of Commercial Geology in which are to be found estimates of the water-powers of various countries. Sweden publishes exhaustive handbooks on her hydro-electric plants, and there is a copious literature on the developments in France and Switzerland.

The estimates of the U.S. Geol. Survey are shown on Fig. 1. It is very clear, however, that estimates of this character, based as they are largely upon rainfall and elevation data, can only be approximate, and in tropical or sub-tropical regions, *e.g.* Central Africa and South America, are of little value. Few countries have made really reliable inquiries into their water-power resources.

It is of course generally true that we find large potential water-powers in regions of high rainfall, but estimates can only be regarded as satisfactory when a number of other factors have been taken into account. The most reliable results are gained when the actual stream flow of the rivers is taken over lengthy periods, for obviously the amount of "run-off" varies with the amount of rainfall, with the surface of the area, especially the nature of the soil and its vegetation cover, and with climatic effects such as evaporation, frost, or melting snows.

[1] A paper read to Section E (Geography) at the Hull Meeting of the British Association.

The value of the water-powers of streams is greatest where there is least variation in the flow. In regions of strongly marked wet and dry periods, while potential water-power may be very great when the streams are full, it may be practically non-existent in the dry season. It is largely because of this fact that the production of power from the

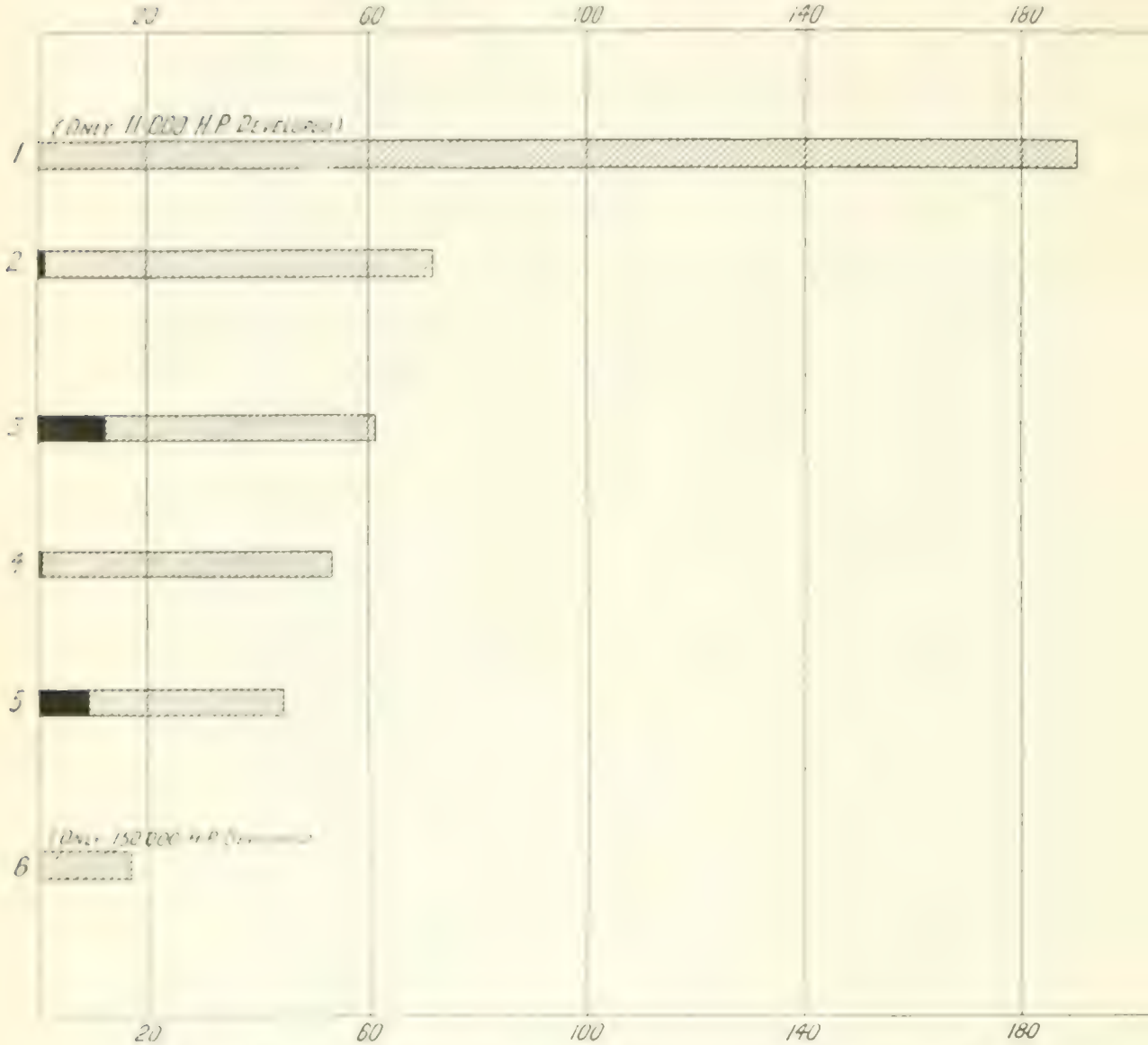

FIG. 1. Hydro-electric power in millions of 100 h.p. in (1) Africa, (2) Asia, (3) N. America, (4) S. America, (5) Europe, and (6) Oceania. The shaded columns show potential power, and the black ones developed power.

streams of Central Africa, South America, India, and South-Eastern Africa may be long delayed.

In periods of high water[1] in the streams, however, many of these regions contain vast potential water-powers. For example, the Congo Basin is estimated to possess 100,000,000 h.p., or about one-fourth of the world's potential water-power, most of it available in the region

[1] See also [illegible], 1919, p. 243.

about Stanley Falls. It is probable, therefore, that ultimately these great stores of energy will be utilised, but not without further development in the matter of long-distance transmission and not until it is possible to organise power demands to coincide with the periods of full stream flow in these regions.

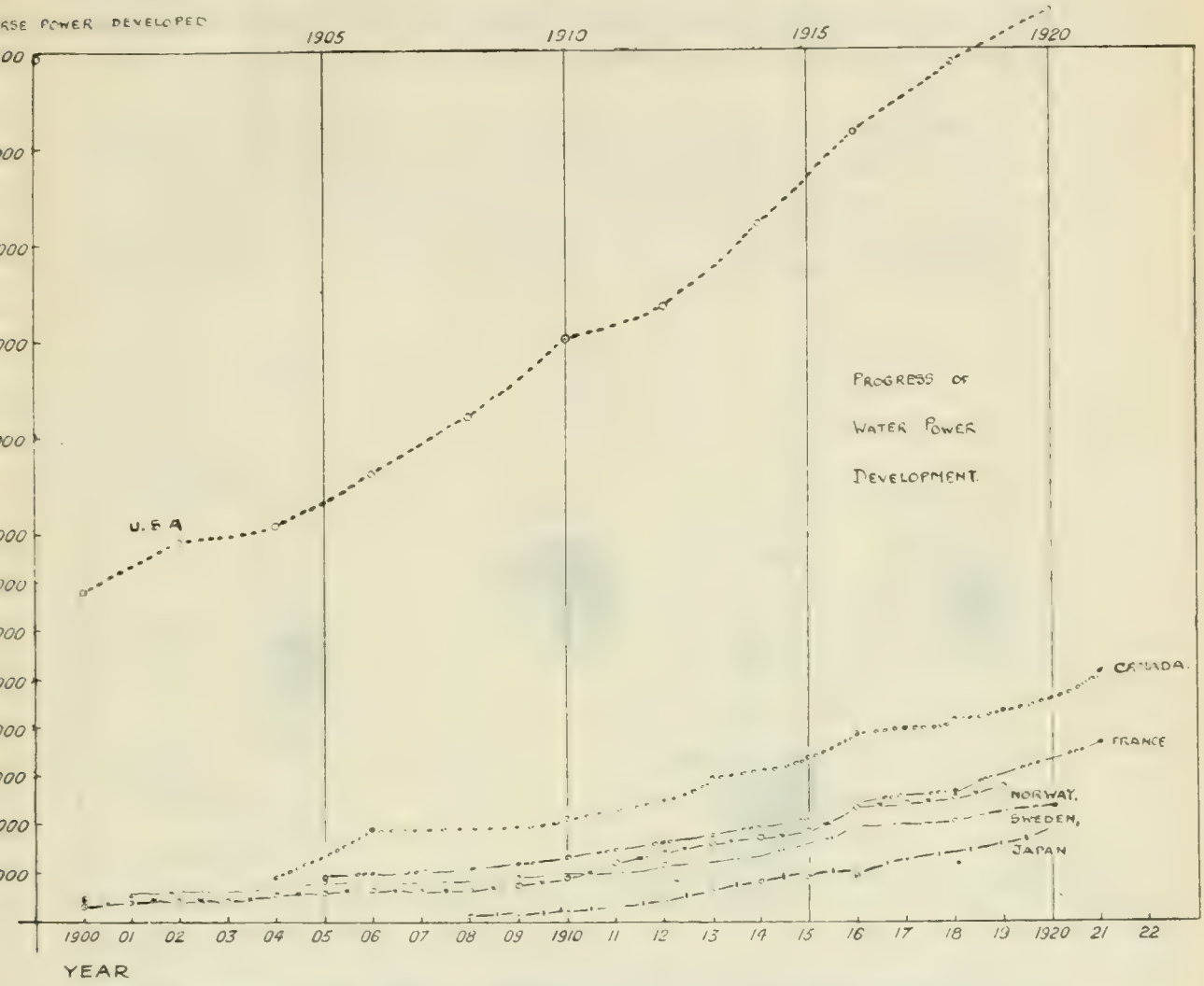

FIG. 2.—Progress of Water-Power Development in U.S.A., Canada, France, Norway, Sweden, and Japan since 1900.

The world's power demands are reckoned to amount annually to 120,000,000 h.p., of which

Factories, Lighting, Trams, etc., use .	75,000,000 h.p.
Railways use	21,000,000 ,,
Shipping uses	24,000,000 ,,

(Including all steam, gas, and hydro-electric plants existing.)

These figures show how significant the Congo water-powers may come to be, and how important is the question of hydro-electrical power when only some 25,000,000 h.p. is developed out of a possible world-supply of 440,000,000 h.p.

It will be said that hydro-electric development is a matter of

relative costs, and that it will develop where it can successfully compete with steam plants. It is no part of this paper to discuss relative costs, but it may be said that h.e. power is extremely cheap where plants can be operated fairly continuously at full capacity. In Europe the average cost per h.p. year for the larger h.e. stations is about £10, 5s., while, under favourable conditions, such as obtain for some of the huge plants of the Ontario H.E. Power Commission, this charge may fall so low as £1, 8s.[1]

If we turn to consider water-power development (Fig. 2) in those countries where most progress has been made, we must study conditions in U.S.A., Canada, Norway, Sweden, Italy, and France, and endeavour to distinguish any differences in the application of h.e. power to industry.

Usually in North America h.e. power-stations are of large capacity,

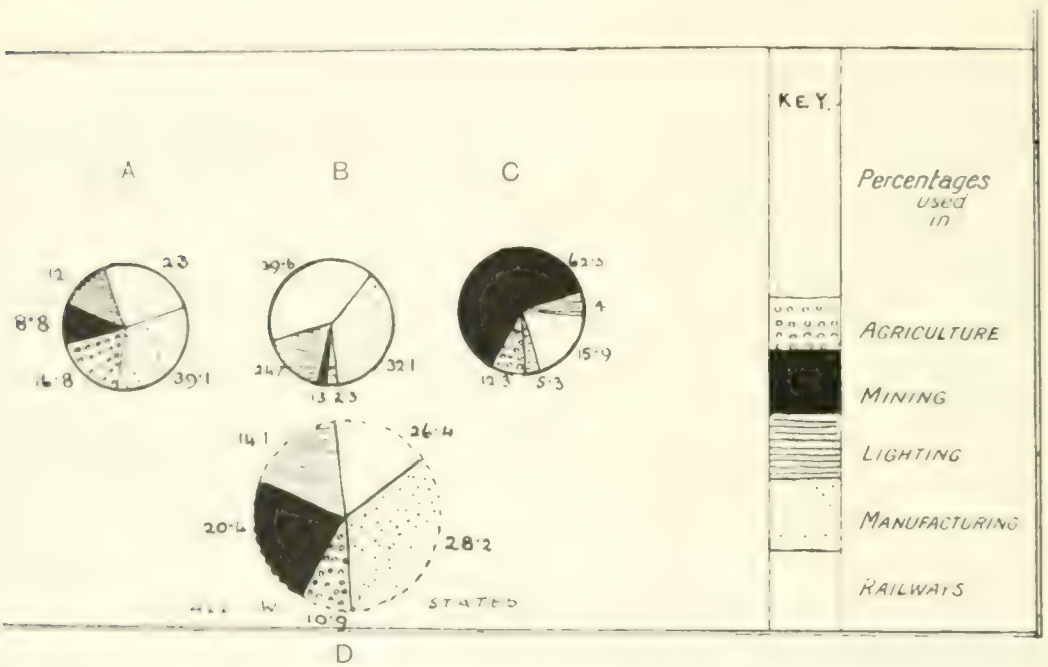

FIG. 3.—Applications of Water-Power in Western U.S.A.

A, Pacific Central States (California and Nevada); B, Pacific N.W. States (Washington, Oregon, Montana, Idaho, Wyoming); C, Intermontane and S.W. States (Utah, Colorado, Arizona, New Mexico); D, All Western States.

operating cheaply, and for the most part contributing energy to a few specific industries. Aluminium-making absorbs a great deal of power; plants like those at Shawinigan Falls, Quebec, the majority of the plants at Niagara, at Massena, New York, Marysville, Tennessee, and Badin, North Carolina, are devoted to this industry.[2] Electrification of railways is absorbing large amounts of h.e. energy, and thermo-electrical smeltings a possibility which would appear to have an important future

[1] *H.E. Power (Ontario, Can., Hydro-El. Niplgon*, p. 29.

[2] *Canad. Railway and Locomotive Engineering*, April 1921; and especially (1) "Bulletin 44016," General Electric Co., N.Y.; (2) "The Future of our Railways," address given by A. H. Armstrong, 43rd Annual Convention of National Electric Light Association, at Pasadena, May 1922.

on the Pacific Coast and in Ontario. In the Western U.S.A., and especially in Canada, the development of water-powers exercises an important industrial control, and industrial activities are almost as strictly confined to water-powers as they were to coalfields in the industrial era of Western Europe. Only in a small measure has h.e. power been applied to agriculture in America, except in the west. The proportions are shown graphically in Fig. 3, and the following table gives the figures :—

DISTRIBUTION OF POWER (KILO-WATT HOURS) SOLD DURING 1920 IN THE PACIFIC AND WESTERN STATES.

	Pacific, Central.	Pacific, N.W.	Intermont, S.W.	All Western States.
Total power generated .	3,751,058,146	2,254,864,367	1,956,405,879	7,962,328,292
Total sales . . .	2,654,792,320	2,078,286,405	1,644,753,270	6,377,831,995
Lighting . . .	320,379,701	514,129,660	65,790,130	900,299,491
Per cent. of total sales	12·0	24·7	4·0	14·1
Agriculture . . .	446,020,996	47,581,425	203,304,652	695,907,073
Per cent. of total sales	16 8	2·3	12·3	10·9
Railways . . .	600,168,407	823,920,590	261,515,770	1,685,604,767
Per cent. of total sales	23·3	39·6	15·9	26·4
Mining	235,926,541	14,726,900	1,031,970,793	1,282,624,234
Per cent. of total sales	8·8	1·3	62·5	20·4
Manufacture and Miscellaneous	1,049,088,303	667,045,374	87,171,963	1,803,305,640
Per cent. of total sales	39·1	32·1	5·3	28·2
Total power load . .	2,331,204,247	1,564,156,754	1,582,963,178	5,478,324,160
Per cent. of total sales	88·0	75·3	96·0	85·9

One noteworthy feature in North America is the increasing degree in which co-operation between steam-electric and hydro-electric plants is being planned. This is of great importance because it involves no displacement of industry hitherto based on coal, and it suggests the line of logical development for h.e. power in areas where steam-power is still the main source of energy.[1]

[1] U.S. Geol Survey, *Prof. Paper* 123/1921.

The area where this scheme is to be put into operation is the "Super-power" zone in the New England States (see Fig. 1). Here the hydro powers are of small capacity—incapable of supplying the energy needs of the area, but affording very considerable aid to steam electric plants. In the area 25 per cent. of the population of U.S.A.

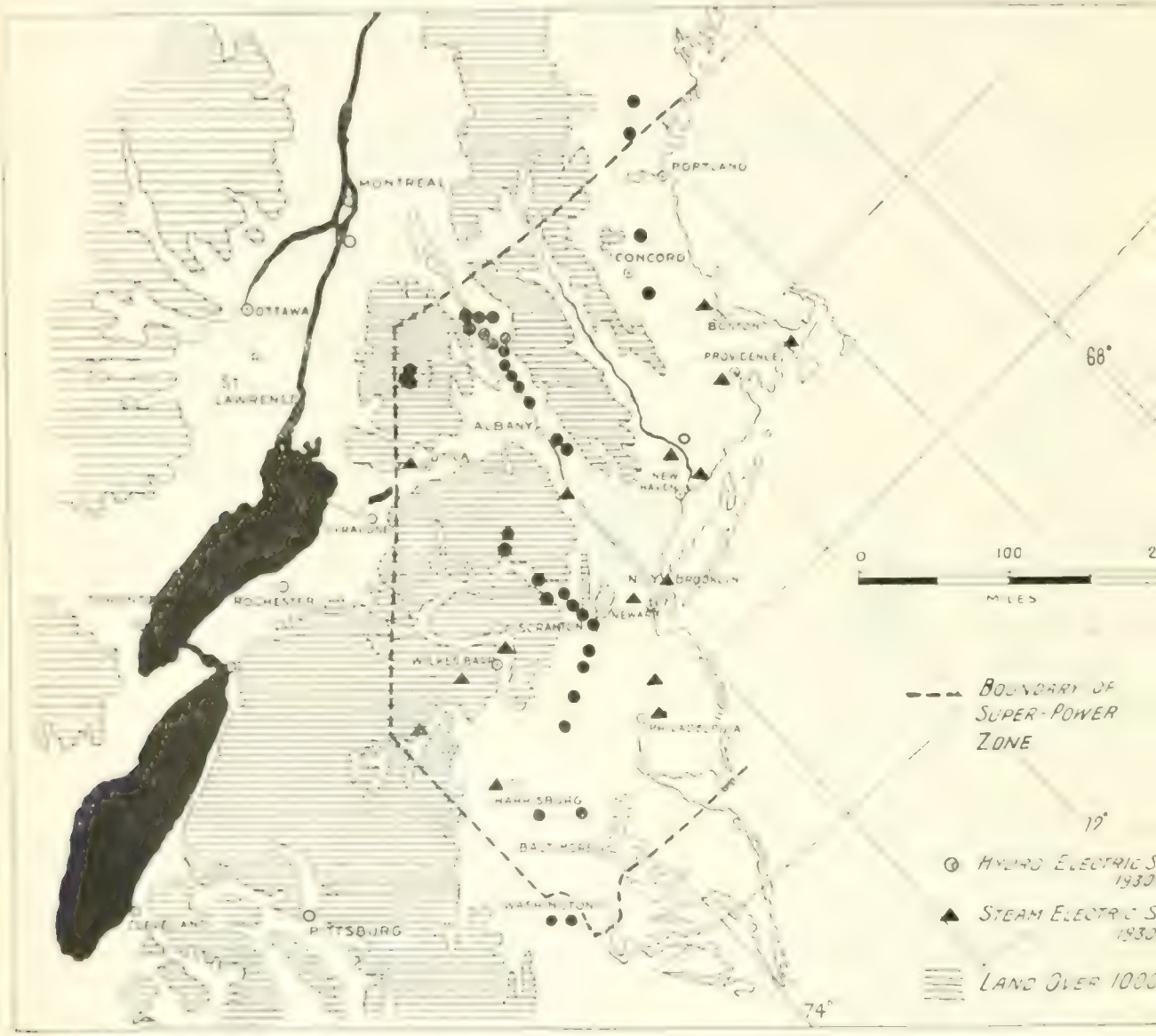

Fig. 1.—The proposed sites of Steam and Hydro-electric Plants in New England Super-Power zone. The scheme is to be completed in 1930.

resides, and there are some 96,000 industrial plants working, of which 76,000 utilise an average of 350 h.p. per year, mostly derived, uneconomically, from isolated power plants.

Under the scheme the power plants will be reduced to 273, 218 of which already exist as large units and will be retained. These plants, steam and hydro-electric, will supply all the power in the area, and will consequently eliminate almost entirely the movement of coal except along specified routes to the main steam plants. Out of 36,000 miles

of railroad 19,000 miles will be electrified, and altogether there will be an annual saving of nearly 50,000,000 tons of coal.

In the chief industrial countries the railroads are often embarrassed by the movements of coal to and from mines and industrial centres. In New England the question was becoming acute. It will now be largely eliminated.

The advantages of such a co-operation between steam and h.e. plants are many. It will produce cheaper power. It will render possible a spacing out of industrial establishments. It will eliminate a good deal of the smoke nuisance, and it will not involve a displacement of industries to new centres.

It has often been supposed that the development of hydro-electric power must mean a redistribution of industries and of the people necessarily connected with them. But although certain industries are being located near the great water-power sites, "while," in the picturesque phrase of Dalemont,[1] "factories make the ascent of the mountains," such co-operation between steam and water power will tend to prevent any displacement on a large scale. Improvements in transmission of electric power will tend further to this result. Hydro-electric power has however brought a new value to mountainous regions, and although h.e. plants require few people to operate them, it is nevertheless true, as Flammarion says, "that mountainous areas, ordinarily classed among the backward communities, have created and developed . . . a magnificent industry, born of the soil, the future of which is immense. The sons of the mountain have wrested from the mountain a force it was expending uselessly." [2]

It is the glaciated regions with their numerous lakes, acting as natural reservoirs for power plants, which give to North America and to Scandinavia such valuable power sites. In such regions the planning and construction of water-power plants are comparatively easy, and the value of the output of electrical energy must be regarded as compensation for the barren and sterile nature of the ground.

The Niagara district of North America is undoubtedly first as regards its production of electrical energy. The amount of water diverted from the river above the Falls is limited by Treaty,[3] but even so it was estimated in 1918 that from the plants on the Canadian side of the river alone there was produced some 1,800,000 h.p.[4] Probably about 4,000,000 h.p. is developed annually from the Niagara area.

The latest power plant using water from the Niagara River above Niagara Falls is the Chippewa-Queenston plant. With its capacity of between 500,000 and 600,000 h.p., it is the largest hydro-electrical installation in the world. Water is taken above the Niagara Falls and led by a power canal to the plant site below the Falls. By this means

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[1] Dalemont, *La Géographie*, xvi., 1907.

[2] Flammarion, *L'Energie française*, pp. 163-197.

[3] *Com. of Conserv., Canada, Rept.*, 1919, p. 248.

[4] *Ibid.*, pp. 71-94.

FIG. 5.—The Chaudière Falls area, Quebec.

an effective head of 305 feet is obtained. The plant is under the control of the Ontario Hydro-Electrical Commission—a State body whose operations control the large water-powers of the State, and which is in a position to supply electrical power at an extremely low rate. It is an example of highly successful State enterprise. Many other power sites, some already harnessed, others still untouched, are to be found in the near neighbourhood, among which can be mentioned Chaudière Falls, Quebec (Fig. 5), Cameron Falls, Ontario, the Long Sault Rapids of the St. Lawrence, and the Ouiachouan Falls, Quebec. Important sites like that of Coquitlam Buntzen (Fig. 6) in British Columbia are typical of

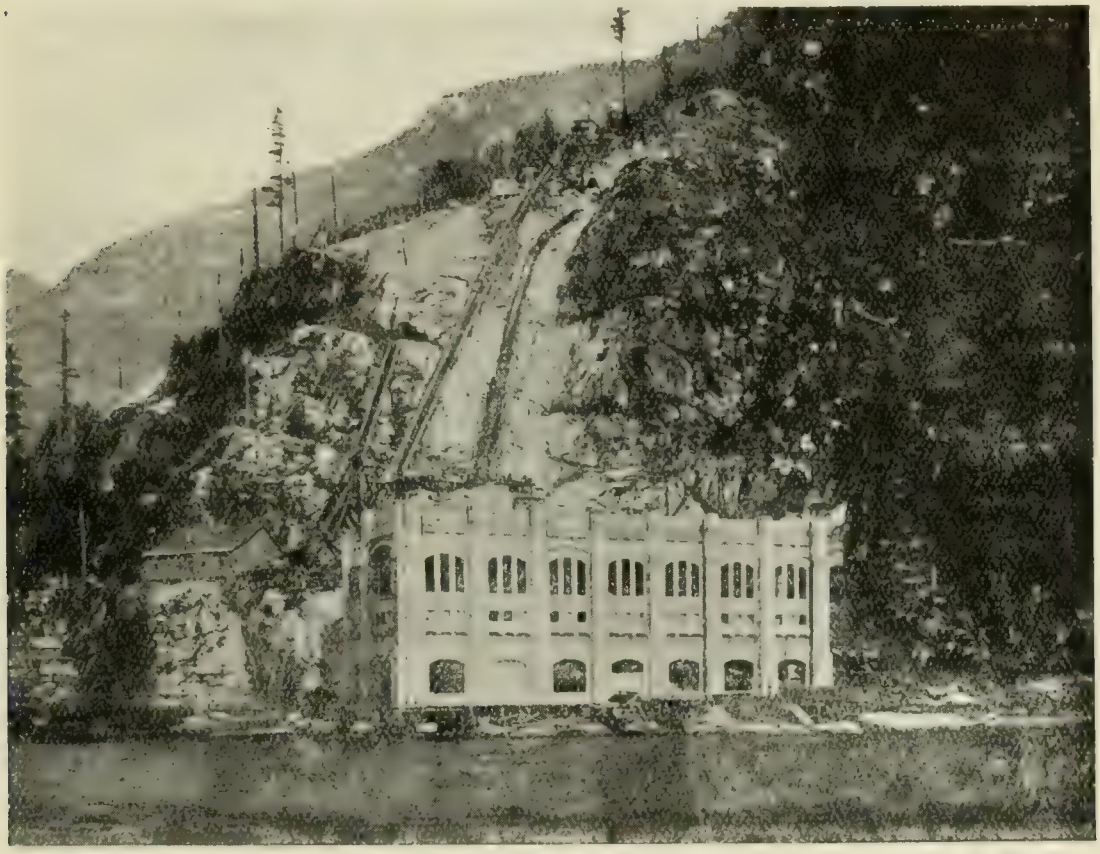

FIG. 6.—One of the two Power Houses of the Coquitlam Buntzen Plant, British Columbia.

the wonderful water-powers of Western North America. The Pacific Coast of North America is especially fortunate in the number and extent of its water-powers (Fig. 7). In California, so long ago as 1894, one of the first hydro-electric plants was built at Folsom. From Alaska to California some 2,200,000 h.p. are developed, and plans are being formulated for uniting the whole of the large plants by a single transmission system for the coast.

Norway, Sweden, Italy, and France (Fig. 8) have developed most water-power in Europe. Switzerland has developed the greatest percentage (80 per cent.) of its available power. In France and Italy most of h.e. energy developed is devoted to specific industries rather than to the rural districts, and in this they resemble U.S.A. and Canada. In Italy

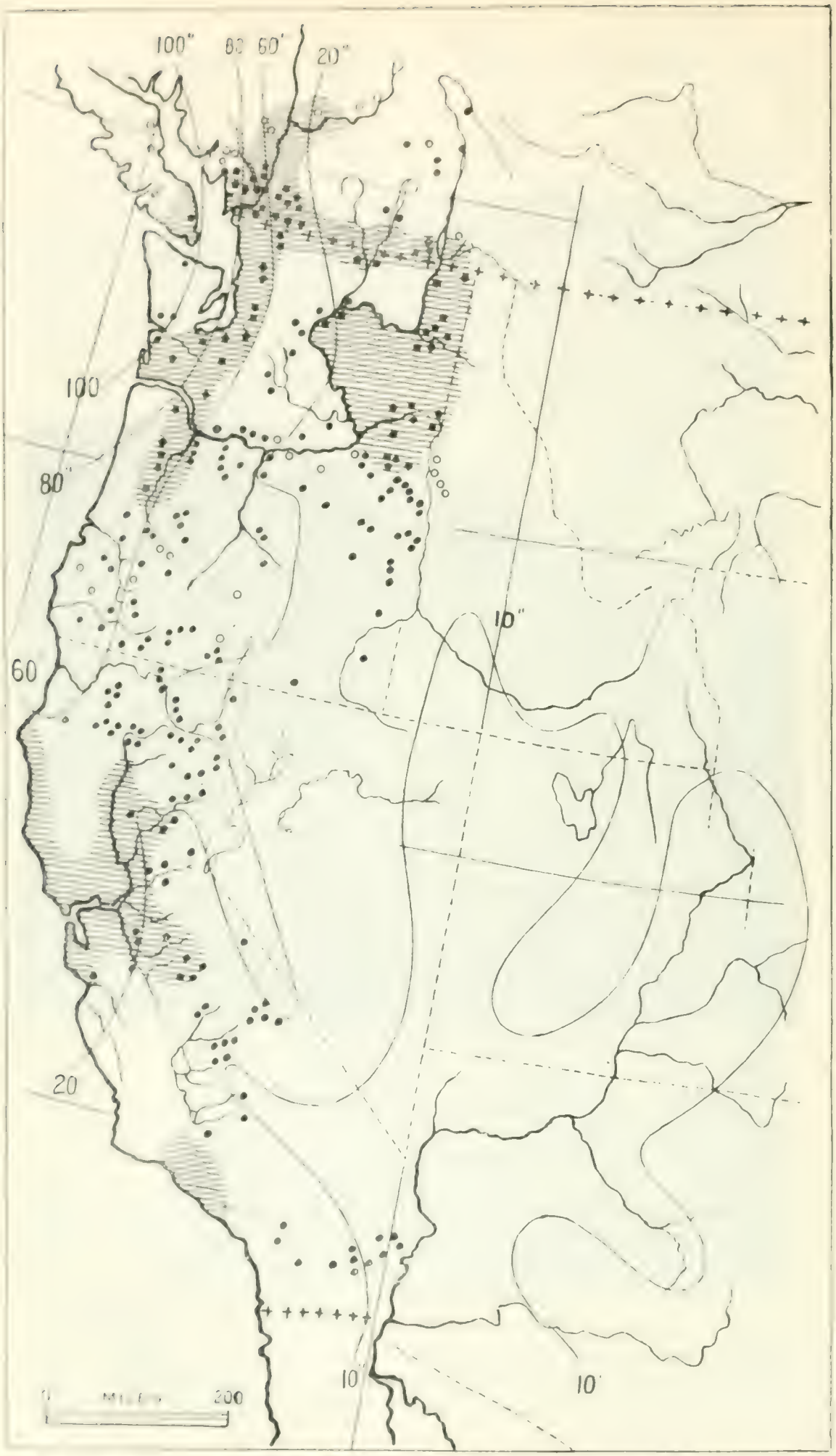

FIG. 7.—Water-power in the Pacific Coast States, U.S.A. The black dots show existing hydro-electric plants, the circles plants in construction. The numbered lines show annual rainfall in inches. The dotted areas have 5–45 persons per square mile, the blank areas less than 5.

great progress has been made, and the country affords an interesting example of the important changes which may be the outcome of h.e. development on a large scale.

Italy has little coal, and while it utilises its lignite deposits as fully as possible, the necessity for importing coal for railways and for smelting works imposes a heavy drain upon a comparatively poor nation. Elec-

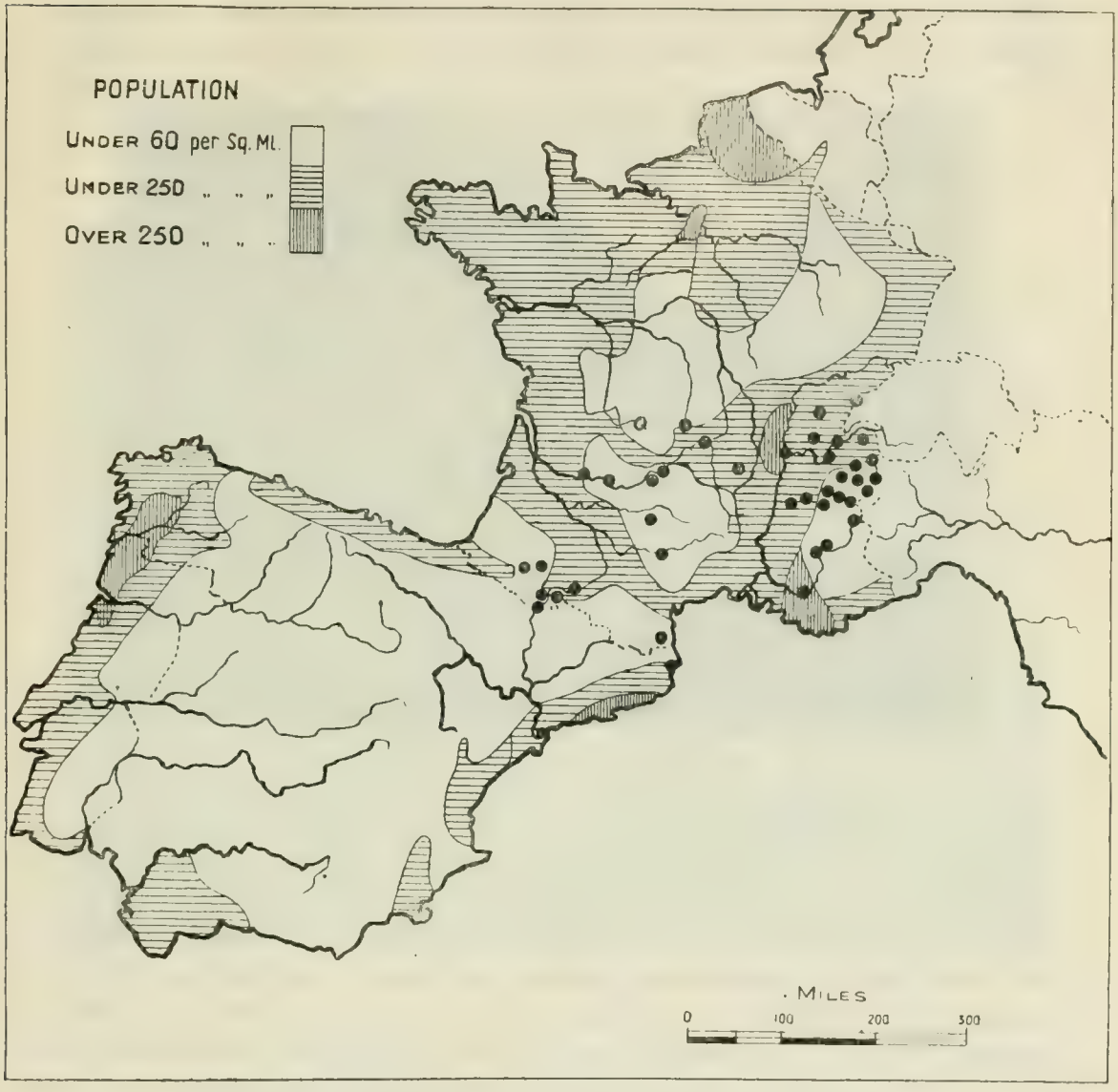

FIG. 8.—The Distribution of Water-Power Plants in France.
The dots indicate plants, in operation or in process of construction, of 10,000 h.p. or over.

trification [1] of railways in the Lombardy plain is taking place, and there is a rapid extension of iron smelting by thermo-electric processes in the Aosta valley near the Cogne iron deposits. Both lines of progress, it is hoped, will lead to the elimination of coal imports to the extent of about 4,000,000 tons per annum. Perhaps the most interesting of all the aspects of h.e. development is the possibilities which attend its appli-

[1] *Economic Revival of Italy*, 1918, Marchetti.

sation to agriculture and to life in rural areas.[1] Electrical power may do much to lighten the tasks and operations of agriculture. We have electrical milking machinery, the extension of the telephone into villages, so common in Norway, apparatus for hay drying, for threshing, for chaff cutting, and churning. Will not the advent of electrical power through a highly organised and widespread system of transmission be a great alleviation in country areas, especially in the rigorous climate of Scandinavia and Northern Canada? Indeed, is not this one of the means by

Fig. 9.—Power Plant of the Portes de Fier, placed where the Fier torrent emerges from its gorge before joining the Rhone, department of Ain, France.

which we are to arrest the steady drain of population from the rural districts?

Sweden's water-power development is perhaps the most instructive for a study of the enormous economic and social possibilities which lie behind such development. Most of the power is generated by State-owned plant and is distributed as is shown in the following summary :—

Distribution of Hydro-Electro Power in Sweden.

Installed hydro-electric power, 1920, ...	1,146,000 h.p.
Electrical Energy generated in hydro-electric plants, .	2,392,300,000 k.h.
.. .. in steam plants, . .	187,800,000 k.h.
.. .. in oil-gas plants, . .	24,200,000 k.h.
Total Energy generated, ...	2,604,300,000 k.h.
Energy used for Industrial Needs, . .	1,404,500,000 k.h. = 54 %
„ „ Electrolytic-smelting, . . .	619,600,000 k.h. = 23·8 %
.. .. Heating, ...	44,600,000 k.h. = 1·6 %
„ „ Lighting and Agriculture, . .	186,130,000 k.h. = 7 %
.. .. Railways, ...	45,800,000 k.h. = 1·7 %

[1] *Commerce Reports*, San Francisco, pp. 612-613, June 15, 1921.

Most of the development is in the south central portion of the country, where the greater lakes act as enormous reservoirs for the power stations. The Director of Water-Powers estimates that "the theoretical limit for full development, including a complete regulation of all water-sheds, would be about 15,800,000 turbine h.p."

Yet it is also stated that in fifteen years' time all the readily available power sites will be harnessed and that it will be necessary to bring power from the rivers of Northern Sweden. Hence there is already projected a trunk transmission line to connect the power plant of Porjus on the Lule Älv with the transmission systems of the south. A recent report states, "In a not so very far distant future there will certainly

FIG. 10.—Rjukan Power Plant, on the Rjukan Fos, Telemark, Norway.

be established a transport on a fairly large scale of electrical energy from the great water-power sources of the north down to the densely populated regions of middle and south Sweden."

Power in Sweden is largely devoted to railway electrification (note especially the line from Riksgränsen-Ripats, 256 kilometres, and eventually between Narvik and Svartö, 500 kilometres), and to thermo-electrical smelting. But of peculiar interest is the great extension of electrical power to rural areas. Over 3,600,000 acres of farm land are supplied with electric power. The distribution is extremely well organised. "Co-operative Distribution Societies are formed by farmers and other smaller consumers. Each society signs a power contract with the Board of Waterfalls, and then resells the energy to its members on conditions fixed by the Society. The capital needed for the erection of

a local distribution system is obtained by the Society by taking up loans in savings banks and others. Usually such loans are repaid in twenty-five years.[1] This method of financing local schemes frees members from making any large initial payment, and consequently does not hamper members who have to make a big outlay on the electrical equipment of their own farms or shops.

It must not be supposed that the power distributed to these agricultural areas is of large amount. In Norway it is still negligible; the vast bulk is consumed by nitrate works. In Sweden out of 1,200,000 h.p. produced by the h.e. stations, 54 per cent. is used by industrial plants, 24 per cent. by thermo-electrical processes (especially in the extreme north), and only 7 per cent. goes for agricultural consumption. Still, there is every reason for believing that this side of water-power development will grow.

If the availability of electrical power in rural districts can do something towards reviving village industries, it will stabilise the seasonal movement of labour and make rural life more attractive.[1]

This is clearly perceived in Norway, as is seen from a comment of considerable interest made in the *Review of Agriculture and Forestry in Norway*, 1921, published by the Director of Agriculture, Kristiania. It states that the use of h.e. power in rural areas "renders possible a considerable extension of home (rural) industry, and thereby the utilisation of unoccupied labour during the quieter periods of the year—a circumstance which may be of the utmost importance in securing for farm-workers steady employment during the whole year, thus binding them more closely to the soil by ensuring to them better economic conditions."

A similar idea, *i.e.* the benefit to the rural population, lies behind the extensive "Sila Lakes" scheme of South Italy.[2]

The Sila is a tableland of 1000 square kilometres in the province of Cosenza, drained by the rivers Neto, Arvo, Ampollina, and others. It is proposed to convert the courses of the streams into a series of lakes by the construction of dams, and impound a head of water with a fall of 1000 metres. Hydro-electric plant designed is for 160,000 h.p., capable of extension to 400,000 h.p., which will supply power to Calabria and East Sicily. The scheme was to have been commenced in 1920, but I have no information as to the amount of progress made.

[1] *Landmandsvirksomhedens Grundvilkaar*. K. Bjerknes, Kristiania, 1921.
[2] *Le Nuove Forze Idrauliche d'Italia*, pp. 44-45. Livio Marchetti, 1918.

HUTS AND VILLAGES IN THE CAMEROON, WEST AFRICA.

By L. W. G. Malcolm.

(With Diagrams.)

In the Cameroon are to be found many types of habitations varying in character according to the geographical nature of the country and the material available for their construction. The object of the present communication is to refer to some of the most important types, together with brief notes on the arrangement of villages in the grassland area.

In the forest area, which is peopled by tribes mainly of Bantu extraction, the hut is nearly always long, low, and right-angled, with a gable roof thatched with bark or palm-leaves. This type is to be found near the coast, as at Calabar, and in the villages right up to the northernmost limit of the forest area.

The Bagielli huts are sometimes made from bark,[1] and sometimes they are thatched with palm [2] or other leaves.[3] In general form, however, they always approximate to the same type. According to Schlechter,[4] a hut built to accommodate two persons has a pyramid-shaped roof. This type, as Passarge [5] points out, somewhat resembles that of the Congo pygmies. The framework is of timber or strips of raphia palm; the walls are woven mats, strips of bark, or they may be mudded. The roof is generally placed in position before the walls are mudded.

As a rule, the gable-roofed hut is united, end-on, with a number of others, and the road runs between the two rows facing each other (A, Fig. 1). Occasionally buildings are built at right angles on the back of the main dwellings, thus forming a three-sided courtyard. Again, they may be built in the form of a square (B, Fig. 1). The men's clubhouse is usually in the centre or at the end of all forest villages, and, as a rule, close to the chief's quarters.

In some of the villages in the Cameroon the double line of huts, with the road running between, extends well over a mile in length.

The second and main type of hut in the Cameroon is round with a conical roof. This is the characteristic dwelling of the Sudan negro. The walls are of matting, woven strips of raphia palm, or they may be mudded. The roof is generally thatched with grass, and in many cases not supported by a central pole.

Where the gable- and conical-roofed huts come into contact with others there is a transitional form. In the grassland area close to the forest the hut is square in vertical section, with walls from nine to twelve feet

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[1] *Globus*, Bd. v., 1903, 284.

[2] *Deut. Kol. Bl.*, Bd. viii., 1902, 312.

[3] *Beitr. zur Kol.-pol. und Kol.-wirtsch.*, 1903, 193.

[4] Schlechter, R., *Westafrikanische Kautschukexpedition*, Berlin, 1900.

[5] Passarge, S., "Kamerun." In Meyer's *Das Deutsches Kolonialreich*, 1. Band, 1909.

high, and a conical pyramid-shaped, grass thatched roof with projecting eaves. This transitional type is to be found in a well-defined area, and will be referred to later.

In the Ossidinge area in the forest zone Mansfeld [1] has described the huts of the Boki, a Sudan tribe which has been forced thither from the grassland. One side is in the form of a half-circle, whilst the other is flattened.

Beehive huts are to be found scattered over Adamawa,[2] and near

FIG. 1.—Forest (A and B) and Grassland (C) types of hut and village in the Cameroon.

the forest area in the west.[3] In the neighbourhood of Gashaka and Banyo I have seen a very simple form made of grass, without walls.

The Musgu and Banana, in the neighbourhood of the Logone River, build conical huts of mud about thirty feet high. They have a rough-ribbed ornamentation, the doorways are low, and are "richly ornamented on the inside by impressions made in the soft mud by finger-

[1] Mansfeld, A., *Urwald-Dokumente*, Berlin, 1908.

[2] Dominik, H., *Kamerun*, Berlin, 1901; Macleod, O., *Chiefs and Cities of Central Africa*, 1912.

[3] *Deut. Kol. Bl.*, 1905, 529; 1906, 464.

tips."[1] Passarge[2] also refers to similar dwellings used by the Kung and Tuburi.[3]

Dominik[4] has recorded the occurrence of a three-cornered hut made of mud used by the Suggi in Adamawa, but the details given are too meagre for our present purpose.

South of Lake Chad and in Bornu the principal dwelling is of mud, right-angled, with a flat roof.[5] This is the characteristic habitation of the natives of the Sahara and the West Sudan.

After ascending the plateau leading from the forest to the grassland area in the Central Cameroon[6] one of the first things that strike the traveller's attention is the complete change in the character of the huts and the arrangement of the village.[7]

Here the construction of the town is entirely different to that of the forest area.[8] The main feature is that there are a number of dissociated compounds, radiating in all directions from the chief's quarters. These compounds are composed of single huts.

Owing to the scarcity of timber, practically all the dwellings, as well as the household furniture, are made from branches of the raphia palm. In certain places, however, as at Bali and on the Nun River, where there is a limited supply of timber, the gable-roofed hut may be found associated with the transitional form.

As already stated, the grassland type of hut is square in vertical section with high walls and with a conical or pyramidal grass-thatched roof and projecting eaves. The whole framework is put together on the ground before erection. The raphia-palm branches are cut to the required length, and holed where necessary. At the points of intersection the cross- and supporting-stays are dowelled by means of wooden pegs. The structure is thus closely knit together and is very strong. When the walls are placed in position they are tied at the corners and along the edges by binders of ratan cane on the outer edge of the raphia palm. When they have been fastened together the ceiling is placed on the top and lashed in position. Four triangular sections are then placed on the top of the ceiling piece, and lashed at the apex and along the edges. Thin poles are then placed in position to support the projecting eaves. The thatch, which is always of grass

[1] Macleod, O., *op. cit.*, 112. [2] Passarge, S., *op. cit.*, 485.

[3] Barth, H., *Reisen und Entdeckungen in Nord- und Zentral-Afrika in den Jahren 1849-55*, Gotha, 1857-59, iii. 221; Bauer, F., *Die deutsche Niger-Benue-Tschadseeexpedition, 1902-3*, Berlin, 1904, 113.

[4] Dominik, H., *Vom Atlantik zum Tsadsee*, Berlin, 1908, 231.

[5] Barth, H., *op. cit.*, iii. 221; Bauer, F., *op. cit.*

[6] Malcolm, L. W. G., "Notes on the Cameroon Province (with Special Reference to the Bamenda Division)," *Scot. Geog. Mag.*, xxxvi., 1920, 145-153.

[7] Hutter, F., *Wanderungen und Forschungen im Nord-Hinterland von Kamerun*, Braunschweig, 1902.

[8] In certain areas single-hut villages are met with, as with the Bassa, Anyang, Mabum, and Keaka. Mansfeld (*op. cit.*, 32) says, "Die Ekoi haben geschlossene Dorfer, weil sie Händler sind; die Keaka und Banyang als Ackerbauer bevorzugen dagegen die Einzelhofe."

(*Gramineæ*), is then worked in and out of the interstices of the roof frame, and when completed presents a very neat appearance. This thatch is nearly always water-tight. On the projecting eaves the grass is rolled and worked in so as to give a rope-like appearance. After the roof has been completed the walls are mudded, this being done by women and boys. Men prepare the mud by working it with their feet. When the first layer has been applied it is allowed to dry, and the cracks are then filled in by a mud wash, and the walls smoothed over.

The entrance is a hole about three feet high and two feet wide, and is never on the ground level, but about eighteen inches above it. The door is of raphia palm, and is hung on a sliding piece inside the hut. It is fastened by means of a simple drop-latch with a string lifter. Occasionally a European staple and hasp are used.

In the larger huts a central structure, square in vertical section, is built inside the hut in order to support the weight of the roof, the summit of which may be as much as forty feet high. In this type of hut interior walls are set up, forming a number of rooms. Only the chiefs or their head cindas are allowed to build this type of hut in the Bagam area.

At Baminyi, the most important village of the Bakongoan, an early type of grassland hut is to be found. About a yard from the main wall there is a second wall made of mats, bamboo, and clay. The eaves of the roof project over this second wall.

In the Bamum area there is an interesting type of hut. In referring to it Ankermann [1] says, "The men's houses (*Herrenhäuser*) in Bamum, in contrast to those of the women, show a most complicated structure. I was very much astonished when I entered for the first time to find myself in an actual Roman atrium with an impluvium in the middle, with the roof sloping towards the middle, and supported by columns." [2]

The construction of the towns depends, as a rule, on the spot where the chief has his compound. This is generally near the market-place and trading-huts. In Bagam the town has spread out in all directions, and the compounds, composed of single huts, are all dissociated from each other.

Each compound consists of a number of huts belonging to the head of the household, his women, children, and slaves. Sometimes small huts are provided for animals as well. There is no set method of arrangement in building a compound. It is generally fenced in by a living hedge or else by a structure of raphia-palm branches. Outside, there is nearly always a small household garden. The main farms may be some distance away from the compounds. The man who is the head

[1] Ankermann, B., "Bericht über eine ethnographische Forschungsreise ins Grasland von Kamerun," *Zeitschr. für Ethn.*, 41e. 1910.

[2] Frobenius in referring to the Yoruban rain-collecting huts says, "These 'impluvia' are only common in those Atlantic regions where there are copious indications of cultural contact with the Sudanese, namely, among the tribes of the Cameroon pasture-lands and the Atlantic." *The Voice of Africa*, 1913, i. 367.

of the compound is in supreme control of it. He may receive instructions from the chief to do certain work, but otherwise he is a perfectly free agent to do just as he pleases.

In every town the chief's compound is by far the most important one. In C, Fig. 1 it will be noted that the main hut is that of the chief, and it is surrounded by those of his women, children, attendants, and slaves. The head chief of Bagam has two dwellings, one of them being of the usual native type, while the other is constructed from materials of European origin. There is a verandah and a number of very small steps. This is an exaggeration of the European custom, because in an ordinary case two steps would have been sufficient. This house was built by carpenters who had been trained by Germans at Duala, and there is very little native influence about it. Exactly in front of it, however, there is an enormous native hut which is used by the chief for ceremonial purposes. Chiefs who may be on a visit are lodged in this place. The chief's immediate quarters are fenced in by mat walls, and the only entrance is by a small opening into the courtyard. The public are not excluded from any other buildings in the chief's compound. The chief of Bali's living quarters are secluded in the same manner, but the other and smaller chiefs do not seem to bother about this custom. The other huts in the compound conform practically to the type already described. In front of, or near to, the chief's quarters there is generally a large cleared space, on which are held various dances and ceremonies. In the case of the town of Bagam there were three definite parts of this space (*izāng fong*) assigned to different ceremonies, all in connection with the propitiation of the ghosts of the tribal ancestors. As these ceremonies play a very real part in the life of the Eghāp the spaces are well kept, and before any particular ceremony are weeded and cleaned by the head chief's women. There are other ceremonial places, all of which are not far from this main ground. The head chief's ancestors are all buried near at hand, and it was found that this was also the case in the adjacent towns.

The various workmen have particular huts and hold them by hereditary rights. They are communicated with by messengers sent direct from the chief. The senior attendants are also heads of compounds, and they enjoy certain privileges through being always in close attendance on the chief. In any administrative or executive work they always take a leading part.

As far as could be seen, there was an entire absence of any clubhouse, the existence of which is so common a feature in the bush-belt towns. The nearest approximation would be the *ndapngōng* or the hut where the ceremonial musical instruments and masks are kept. It is also used as a prison and is in charge of an attendant.

The other public buildings are the Government Rest Camp and the Native Court, the latter being an innovation of the British Administration. From what could be gathered it has not been altogether a success, probably owing to the lack of close supervision, which was quite impos-

sible at the time of my visit owing to the lack of political officers in the Division.

In the Bagam area the market takes a very prominent part in the life of the people. Each town has a regular day for holding sales, and in consequence there is a continual flow of traders travelling on the country roads. As a rule, in each town and sub-town the market sites are very close to the chief's compound. The market consists of a cleared

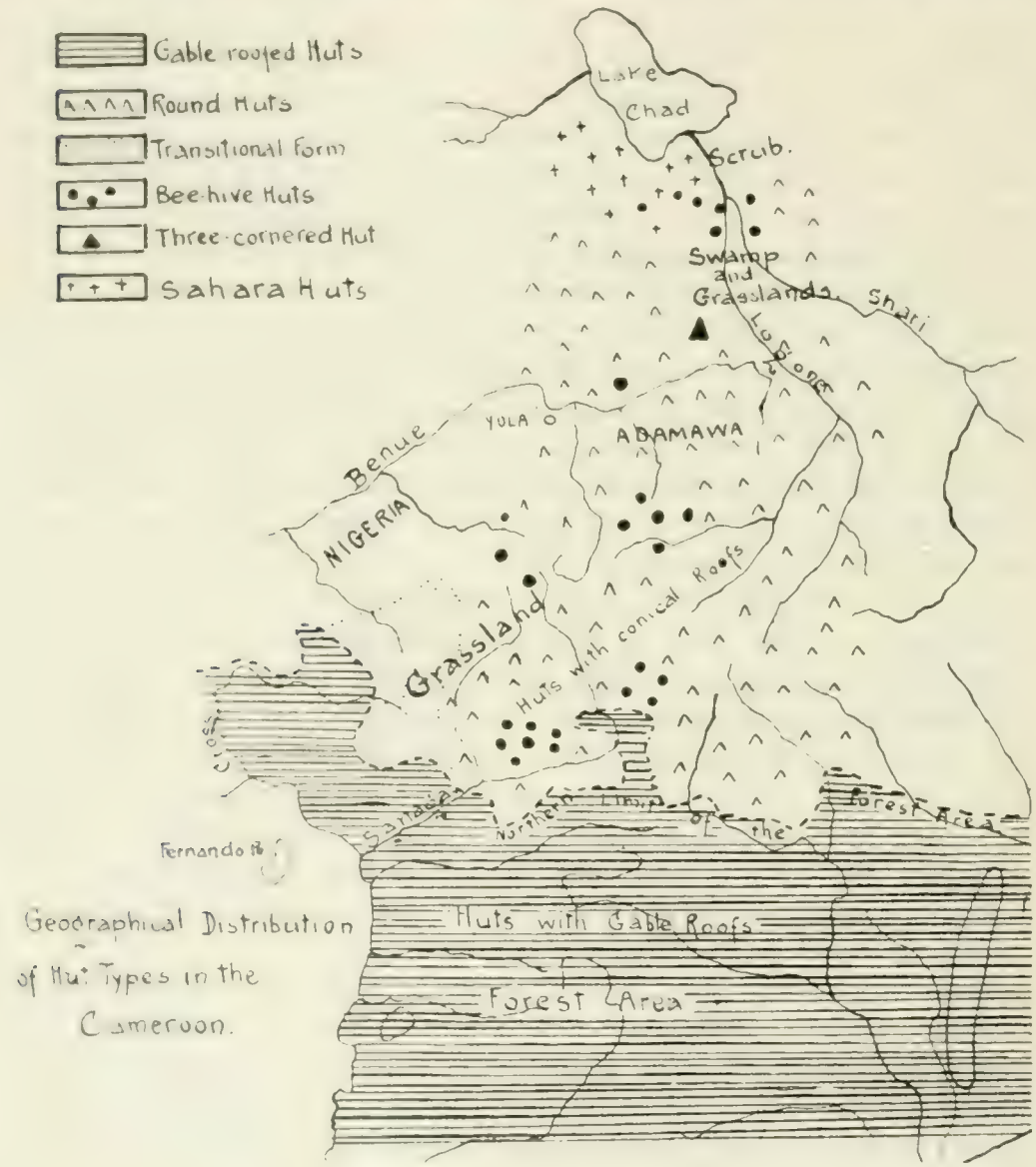

FIG. 2.—Distribution of Hut Types in the Cameroon.

space of ground which borders the main road. There are no permanent booths, but temporary shelters are usually built by the purveyors of palm-oil.

In addition to the barter and sales of goods the market-place is used to deliver the chief's orders in the shape of proclamations to the assembled tribespeople. Before marriage a bride is taken in procession to this place in order that she may show herself duly prepared. When

a townsman has killed a leopard or performed some meritorious action a dance in his honour is held here also. In former times it was the site where capital punishment was administered Nowadays the function of the market is the purposes of legitimate trade and occasional ceremonies. Sub-markets are held daily at convenient points where there are many people passing. As the people in the grassland area are primarily agriculturists, it follows that the main articles of sale are the produce of the farms, and to a lesser extent articles of local manufacture. The main towns have their own particular customs, and as a result there is a continual exchange of saleable articles, and to a certain degree a mixture of material cultures.

Reference has been made to the sharp line of demarcation between the forest and the grassland areas in the Cameroon, and in Fig. 2 I have shown this division from material furnished by Moisel.[1] In the same map I have shown the geographical distribution of the main types of habitations of the area under review, which has been compiled from various sources[2] as well as from my own original observations. It will be noted that certain types of huts are confined to definite areas, and in a future paper it is proposed to deal more fully with the effect of geographical environment on racial culture complexes, more particularly in the grassland area of the Cameroon.

GEOGRAPHY AT THE BRITISH ASSOCIATION.

The Ninetieth Annual Meeting of the British Association was held in Hull from September 6 to September 13, under the presidency of Sir C. S. Sherrington. The meeting was a very successful one, and a gratifying feature of the proceedings of Section E (Geography) was the large number of professional geographers who took part.

The proceedings opened on Thursday morning with a paper by Miss E. C. Semple, the distinguished American geographer, who was present as a guest throughout the meeting. Her paper dealt with "The Influence of Geographic Conditions upon Ancient Mediterranean Agriculture," and discussed in detail the effect, especially of climate, upon the methods of cultivation practised in early times, as illustrated in the writings of classical authors.

Mrs. H. Ormsby followed with a paper on "The Danube as a Waterway," based upon a recent visit to Central Europe. We hope to publish this paper here at a later date. According to the new arrangement, which aims at the prevention of the simultaneous delivery of presidential addresses in related sections, the address to Section E did not open the proceedings, but formed the last item of the morning's

[1] Moisel, M., "Die Grenzen des Zentral- und Westafrikanischen Urwaldes," *Mitt. aus d. deut. Schutzgeb.*, 30(2), 1917, 171-172.

[2] Passarge, S., *op. cit.*

programme. This address has been already published here (vol. xxxviii. p. 209).

In the afternoon Sir Philip Brocklehurst gave a lantern address on his travels in Wadai.

On Friday the proceedings opened with a paper by Professor J. F. Unstead on "The Belt of Political Change in Eastern Europe," which we hope to publish in this *Magazine*. The paper pointed out that the new states in Europe occupy a narrow but continuous belt separating Western Europe from Russia proper, which forms in many respects a transitional area. Emphasis was laid upon the mixture of races in this belt, and on the absence of complete fusion of the different elements, with resultant difficult social and ethnic problems. Professor Unstead's paper was followed by two on local subjects. Mr. Rodwell Jones gave an address, illustrated by lantern slides, on the development of the port of Hull, and Mr. C. Midgley discussed the problems of water-supply in Holderness. Mr. H. M. Spink then read the paper on "Recent Developments of Water-Power," which we publish in this issue (p. 7). Mr. Spink was followed by Mr. A. V. Williamson who, with the help of lantern slides, discussed irrigation in the Indo-Gangetic Alluvium. He pointed out the way in which geographical factors governed the methods adopted to meet the need for irrigation, paying special attention to the distribution and utilisation of (*a*) wells and (*b*) canals.

Mr. D. C. T. Mekie then read a paper on the "Trend of World Commerce," in which he discussed the meaning and validity of Professor Russell Smith's "law of trade," as expressed in the following statement: "At the present time the great bulk of our commerce depends upon differences in the stage of industrial development, *i.e.* it is an east-to-west trade, but the north-south trade is the trade of the future." The paper contained a short summary account of the nature and direction of ancient and mediæval long distance trade, showing that this was for the most part in a north-to-south direction. The east-to-west trade of which Professor Russell speaks was chiefly due to the Industrial Revolution—that is, the establishment of large scale industry in certain countries, with a consequent demand in these for imported food. The change which Professor Smith anticipates in the near future implies that the manufacturing areas will become increasingly dependent on food materials derived from tropical rather than from temperate regions.

On Monday, September 11, Dr. T. Ashby gave a lantern exhibition of early maps of Malta, showing maps of the whole island and of Valetta, belonging to the sixteenth, seventeenth, eighteenth, and nineteenth centuries. He was followed by Mr. R. A. Frazer, who discussed the topographical work carried out by the recent expedition to Spitsbergen. Both this paper and one by Mr. F. Debenham, O.B.E., on "Survey in Polar Regions," brought out the difficulties met with by the surveyor in high latitudes owing to the climatic conditions. Mr. Debenham, in addition to a general account of methods, dealt shortly with the problem of the reliability of the results obtained by explorers during forced

marches over land or sea ice, illustrating from the notebooks of the members of Scott's last polar expedition. Mapping problems of a somewhat different type were discussed by Mr. Alan G. Ogilvie in his paper on "The Mapping of Latin America." Mr. Ogilvie exhibited a provisional map showing the present state of cartographic knowledge of the area dealt with, the map forming part of the work carried out by the American Geographical Society in its Hispanic American division. This index map is based largely on examination of original sources, and thus affords a useful means of checking the limits of accuracy of published maps. The most interesting point brought out is that nearly all the lands in which areas of any size, as opposed to mere routes, have been surveyed, lie in the unforested regions of South America or in regions of open woodland. The great forest of the Amazon region is still largely unsurveyed, and few even of its rivers have been surveyed by accurate methods.

After the reading of Mr. Ogilvie's paper a discussion on the Use of Mercator's Projection for Air-maps took place. This arose out of a paper read by Colonel Lees at the Edinburgh meeting (cf. vol. xxxvii. p. 249). In that paper and in the discussion which followed some stress was laid on the question of the use of Mercator's projection for such maps, for from the point of view of scientific cartography this projection has notable defects, and the Sectional Committee asked for further information on the subject. Colonel Jack, who opened the discussion at Hull, Professor Turner, and others, however, emphasised the practical value of the projection to the aviator.

At the end of the morning Professor Roxby gave some account of the city of Peking and its place in the life of modern China. The afternoon was devoted to a joint discussion with Sections C and H on "The Relation of Early Man to Phases of the Ice Age in Britain." The discussion illustrated some of the difficulties which present themselves in practice when different Sections meet in joint session. It is found that it is rarely possible to define the scope so accurately that all possibility of misunderstanding is obviated, and since, whatever the problem raised, the members of the two or three Sections assembled almost inevitably look at it from different points of view, a basis for a really useful discussion is not always easy to find. On the whole, it may be said that the particular discussion resolved itself into a duel between the geologists and the archæologists, though Professor Fleure put the geographical standpoint with much force. No very definite decision was come to, but some of the problems requiring solution were at least definitely stated.

On Tuesday morning, September 12, Dr. Vaughan Cornish communicated the paper which we publish here on p. 1. He was followed by Mr. R. R. Walls, who spoke on Portuguese Nyasaland (cf. this *Magazine*, vol. xxxviii. p. 164). Miss H. A. Wilcox then read a paper on a "Scheme for the Preparation of a Map of the Early Woodlands of Britain," illustrating by maps prepared for areas in south-west and south-east England. The proceedings of the Section closed with a joint

discussion with Section A (Cosmical Physics sub-section) on Monsoons. The discussion was opened by Dr. G. C. Simpson, whose remarks followed broadly the lines of his paper published in the *Quarterly Journal* of the Royal Meteorological Society, of which an abstract was given here in vol. xxxviii. p. 186. Others who took part in the discussion were Mr. George G. Chisholm, Dr. H. Jeffreys, Mr. W. G. Kendrew, and Dr. C. W. Normand.

During the meeting the fine collection of maps of Hull and the Humber estuary formed by Mr. T. Sheppard were on view in the Section room. Mr. Sheppard was also the editor of the official *Handbook*, and acted as one of the local secretaries for the meeting.

As a result of a discussion initiated by Mr. Alan Ogilvie in the committee of Section E, a small committee was appointed to consider the advisability of making a provisional population map of the British Isles, and to make recommendations as to methods of construction and reproduction. Mr. H. O. Beckitt was appointed chairman of the committee and Mr. F. Debenham secretary.

In regard to the proceedings in other sections, we may note two papers in Section D (Zoology), which appear to have geographical bearings. In his presidential address Dr. E. J. Allen discussed some points in regard to food-salts in sea-water in connection with the abundance of fish in certain areas. The basal source of food-supply in the sea is of course to be sought chiefly in the minute unicellular plants known as diatoms. Now among the factors influencing the rapid reproduction of these minute plants is a sufficient supply of mineral salts, especially nitrates and phosphates, together with the energy of sunlight. Thus the abundance of diatoms in coastal waters and in seas largely enclosed by land, such as the North Sea, is due to the quantity of nutrient salts washed directly from the land by rain or brought down by rivers. But an exceptional abundance of such forms is also often found where there is an upwelling of water from the bottom layers of the sea. These conditions are met with where a strong current strikes a submerged bank, or where two currents meet. Food-salts which had accumulated in the depths, where they could not be used owing to lack of light, are brought by the upwelling water to the surface and become available for plant growth. The remarkable richness of fish life in such places as the banks of Newfoundland and the Agulhas banks off the South African coast, each of which is the meeting place of two great currents, is to be explained in this way.

The other paper is one on the fauna of the sea-floor by Dr. C. G. Petersen, Director of the Biological Station, Copenhagen. Its interest lies in the account given of a new method of studying the fauna of the sea-floor. If further developed, this method should not only throw much light upon the problems connected with the continued productivity of sea-fisheries, but should render it possible to study the bottom fauna after a fashion comparable to that adopted by the ecological botanist in his study of land plant-associations.

In place of using the dredge Dr. Petersen has constructed what he calls a bottom sampler, capable of being used to depths down to 300 fathoms, and with this instrument he has carried out extensive investigations in Scandinavian waters. He finds by this means that round Denmark there are about eight different animal communities, living at depths from 0 to 300 fathoms, and consisting mainly of animals living on detritus. In contrast to these communities, which form the true bottom fauna, he finds also what he calls the epi-fauna. This consists of animals living not in the sea-floor, but above it, fixed to stones, shells, wrecks, living plants, and so on. On rocky coasts the epi-fauna necessarily predominates, and coral reefs may be regarded as a kind of epi-fauna built up mainly of chalk and water, and therefore of little value as fish-food. The distribution of the epi-fauna in the general case is necessarily erratic, but the communities of the level sea-floor have a very uniform distribution, and may be easily mapped and their content of fish-food quantitatively determined. In 1921 Dr. Petersen's method was employed on an English steamer in a journey from Esbjerg to Lowestoft, when some of the same communities were found as occur in the Kattegat. The possibilities of the method are clearly great, and Dr. Petersen discussed some of the practical and scientific problems which might be solved by its extended use. A full report will be found in *Nature* for October 14 last.

In his presidential address to Section G (Engineering), Prof. T. Hudson Beare dealt with Railway Problems in Australia, especially the difficulty of the existing differences of gauge, and the joining up of the tropical areas of Northern Australia with the south and east. In regard to the first problem, it was suggested that some mechanical device for overcoming the difficulties of the break of gauge would render it possible to postpone the proposed unification of gauge until costs of construction have fallen. The best means of solving the second problem are still under discussion in Australia, but the need for a speedy solution is shown by the fact that at the present time the journey by sea from Brisbane, the nearest state capital, to Darwin takes longer than the sea voyage from Darwin to Singapore or Hong-Kong. This is clearly a perilous state of affairs in connection with the White Australia policy.

The next meeting of the Association is to be at Liverpool from September 12-19, 1923, while the invitation to Toronto has been accepted for 1924.

MR. CHISHOLM'S *HANDBOOK OF COMMERCIAL GEOGRAPHY*[1]: AN APPRECIATION.

By J. McFARLANE, M.A.

It almost seems a work of supererogation to review Mr. Chisholm's *Handbook of Commercial Geography*, which has held pride of place as the standard work on the subject for thirty three years, which has now passed into its ninth edition, and which in one form or another has been reprinted over twenty times. But, as the matter with which he deals is constantly undergoing change, each revision demands a great amount of labour, and it is a striking testimony to the vigour and elasticity of the author's mind that this, the ninth edition of his work, should represent as vividly as the earlier editions, and even more vividly, the world which it seeks to portray. The lapse of time since the eighth edition was published in 1911, and the economic and political changes brought about by the War not only in Europe but in almost every part of the world, have made the reconstruction of the book a necessity, and that reconstruction has been carried out with marked success. At the same time a number of new sections have been added, and an abundance of footnotes—almost a superabundance—brings the work up to the date at which it finally went to press.

Among the more important additions which have been made we may note a consideration of the effect of altitude on temperature, a matter of some importance to the economic geographer, as the author points out. Two maps have been introduced, one showing the distribution of actual temperature over the land, and the other the distribution of rainfall. The section on Coal has been extended, and several interesting tables, one showing the uses to which that mineral is put in the United Kingdom, Germany, and the United States respectively, have been included. The competition between railways and canals in Great Britain is more fully discussed than in the previous editions, and a map is given indicating the position of the four trunk inland waterways proposed by the Royal Commission on Canals and Inland Navigations. A table of alternative geographical names, for which we believe most readers in these days will be thankful, has been placed in the appendix. But in every part of the book there is much new matter, and one cannot but admire the way in which Mr. Chisholm keeps control of the great mass of material which he has collected. Again and again he compresses into a single page a discussion which takes account of every aspect of the subject under consideration. In one respect only has he been unable to keep his book up to date. The statistical tables in the appendix giving the average values of the foreign trade of the principal foreign countries for quinquennial periods from 1871 onwards are not carried beyond 1912

[1] *Handbook of Commercial Geography.* By Geo. G. Chisholm, M.A., B.Sc. London, Longmans, Green and Co. Price £1, 5s.

because, as the author justly remarks, he "can attach no meaning to average values for any period comparable with those of pre-war periods."

The student of economic geography is concerned with a world in which, even in normal times, there is continual change, and any book on the subject which he writes must inevitably cease to be an accurate description within a comparatively short period of time. But it does not necessarily follow on that account that what he writes is writ in water. Quite apart from the historical value of Mr. Chisholm's *Handbook* as providing for the future a faithful picture of the conditions which existed at the time when it was written, it has in various ways exercised what we must deem to be a permanent influence. For to its author belongs the distinction of having practically created, in this country at least, the subject of Commercial Geography, and the fact that this subject is now a compulsory one in almost every graduation course in Commerce in British Universities is a striking testimony to the position which he has given it. Moreover, he has shown that in it, as in other branches of learning which have been longer established and, for that reason it may be, are held in higher repute, there is the same opportunity for that rigorous search after truth for truth's sake, for that balanced judgment between conflicting views, and for that precise statement which are the essence of all real scholarship. It is sometimes argued against geographers, and perhaps not without a certain amount of justice, that they tend to leap at conclusions without first carefully investigating the facts upon which these conclusions appear to be based. Such a charge can never be brought against Mr. Chisholm, and if we have fewer generalisations in his work than in some others, we have at least the satisfaction of knowing that those which we do have are proof against attack. At the same time his early scientific training, his wide historical knowledge, and his interest in political and social as well as in economic problems guard him against the danger of a narrow specialisation, and he is no less effective in discussing the historical geography of Mesopotamia or in explaining the moral and social factors in Chinese civilisation than he is in describing the railways of Central Europe or the development of modern industry in India and Japan.

But while he has drawn abundantly on these arts and sciences which may be regarded as tributary to geography, his work remains essentially geographical, and he has given us an interpretation of the economic activities of man in terms of his age-long struggle to adapt himself to his environment and to obtain from it the maximum benefit. Mr. Chisholm's view of the nature of that struggle is as usual eminently sane. "I do not mean to hint that man has no control over his destiny. But he must stoop to conquer. To subdue nature he must submit to nature's laws, and the more reverently he does so the better it will be for him. With the passing of the centuries he can go farther and farther in that conquest. But at all times the earth says 'thus far and no farther,' and it is impossible to foresee a time when we shall be able to look upon geographical studies as superfluous." This conception of the nature

of geographical control is vindicated on almost every page that Mr. Chisholm writes, and is indeed the keynote of the subject which he has so long and faithfully studied.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

Society's Gold Medal Award.

At a meeting of Council held on October 31 it was unanimously resolved to award the Society's Gold Medal to Professor J. W. Gregory, Glasgow University, in recognition of his repeated and important services to geography, largely based on exploration in different parts of the world.

The late Professor C. G. Knott.

The Council desire to place on record their sense of the great loss that the Society has sustained through the death of Dr. Cargill Gilston Knott.

Dr. Knott was a member of the Society almost from the beginning, having joined it in 1886 immediately after his return from Japan, and he served on the Council for thirteen years—from 1892 to 1905. He was also a considerable contributor to the *Magazine*, his papers and reviews referring especially to Japan and Seismology. In 1892 he lectured to all branches of the Society on "Japanese Characteristics," and this paper appears in the *Magazine*, vol. VIII. To vol. XV. he contributed a paper called "The New Seismology" and a further paper in continuation of this one appears as "Seismological Studies" in vol. XXI.

Annual Business Meeting.

The Annual Business Meeting was held on November 9 in the Society's Rooms, Dr. John Horne presiding.

The Thirty-eighth Annual Report of the Council, on the motion of Mr. T. Clendinnen, seconded by the Rev. Dr. W. S. Sutherland, was adopted.

The list of office-bearers recommended by the Council for election for the current session was also submitted and the following appointments made:—

The Right Hon. Lord Salvesen, P.C., was re-elected President, and H. M. Cadell, F.R.S.E., Chairman of Council.

The previous Vice-Presidents were re-elected.

James Watt, W.S., and Robert S. Allan, LL.D., were elected Trustees of the Society.

The following Members of Council who were due to retire by

rotation were re-elected :—John Horne, LL.D., F.R.S. ; D. F. Lowe, M.A., LL.D. ; T. S. Muir, F.R.S.G.S. ; W. R. Kermack, M.C., F.R.G.S. ; Major-General P. C. Dalmahoy ; William Cowan ; Emeritus-Professor F. M. Caird ; Professor D. J. Medley, Glasgow ; P. S. Brown, J.P., Dundee ; Major W. H. Coltman, Aberdeen.

The following Members of the Society were elected to fill the vacancies existing :—Arthur O. Cooke ; Harry W. Smith, W.S. ; A. Patterson Gray, M.A., F.R.S.G.S., Edinburgh ; Andrew Houston ; John S. Galbraith, B.L., J.P., Glasgow ; Principal J. Yule Mackay, Dundee.

A. Ernest Maylard, M.B., B.Sc., F.R.S.E., Glasgow ; J. C. Buist, Dundee ; Colonel D. B. D. Stewart, Aberdeen, were re-elected Chairmen of Centres.

In reviewing the work of last session Dr. Horne referred to the satisfactory reports which had been presented by the officials of the Society. The List of Members and Associates has been considerably increased, and the financial report justifies the hope, that, with careful management, the stage of recurring deficits caused by the War has been passed. It may be said the Society has safely turned the corner. The Council look forward, with reasonable confidence, to a prosperous future.

One of the unfortunate steps which the Council were compelled to take owing to the effects of the War was the quarterly issue of the *Magazine*. The success of the Society has been due, in no small measure, to this publication, which, under the able editorship of Dr. Marion Newbigin, maintains a prominent position among geographical journals. Quite recently the Professor of Geography in London University had called attention to its educational value. The lectures appeal to a limited number in the four centres, but the *Magazine* reaches a wider circle at home and abroad. The section devoted to the reviews of books acts as a feeder to the Society's library. The change in the issue, which at the time was inevitable, was not intended to be permanent. The Council, recognising the value of this publication, have appointed a committee to report on the adoption of a bi-monthly issue as a step towards the resumption of the monthly issue which held sway for so many years.

GEOGRAPHICAL NOTES.

Europe.

The Devastated Area in France.—In the *Annales de Géographie* for July 15 last, M. R. Musset gives a summary account, based upon official reports, of the extent to which the areas within the war zone in France have been restored to agriculture. It is estimated that over eight and a half million acres, of which nearly five million acres were arable, were devastated by the War. These lands are classified, according to the degree of damage, into blue, yellow, and red zones. In the first

case the war effects were limited chiefly to absence of cultivation, or imperfect cultivation, leading to the growth of weeds and to the loss of fertility owing to want of manure. It is noted that the dry autumn of 1920, and the similarly dry spring of 1921, were favourable to the necessary cleaning process. In these lands agricultural reconstruction has made great strides, and the peasants have been able to undertake cultivation at once, no preliminary operations being necessary. In both the other zones, as a necessary preliminary to ploughing, elaborate levelling and clearing operations were necessary. These were carried out by the State, and are virtually completed in both belts. But cultivation remains both difficult and costly: in the red zone the measures necessary will take long years, and involve outlays greater than the value of the land. Some of these lands will remain permanently waste or must be put under wood.

In certain areas special difficulties arise. Thus round Verdun the surface destruction has been so great that the old landmarks in this area of small properties have been obliterated, and a re-division of the land is necessary. In Picardy and Artois where, owing to the level surface, motor-tractors could be easily employed, much progress has been made: but a serious economic difficulty presents itself. Before the War, sugar-beet formed the chief crop, combined with stock-rearing and wheat-growing, both of which depended upon the staple; for the beet requires a well-manured soil, the cattle were fed on the beet residue from the sugar factories, and wheat as a rotation crop gave high yields. With the complete destruction of the sugar factories, beet can no longer be profitably grown, stock-rearing thus becomes difficult, and wheat has to become the main crop. Again, in the Ardennes the actual damage to the land was slight, but the small hardy horses, which formed the main stock, and which were extensively reared, were carried off: the characteristic industry has thus received a fatal blow. Finally, it is noted that round Noyon and Lassigny, originally a land of small-holders and of medium-sized properties, the actual reconstruction of the surface has made great progress. But the complete destruction by the enemy, during the retreat of 1917, of the fruit-trees, especially cherries, which played a very important part in the local rural economy, is an injury which it will take long to repair.

On the whole, however, thanks to the attachment of the French peasant to his land, agricultural reconstruction has made great strides, much greater than that of habitations or of industry.

The Submarine Valley of Cap-Breton.—In this *Magazine*, vol. iii. (1887), there appears a paper by Mr. J. Y. Buchanan, entitled "On the Land Slopes separating Continents and Ocean Basins," dealing especially with the results of soundings off the west coast of Africa. In this paper, after discussing the submarine gully off the mouth of the Congo, the author goes on to say—"at the head of the Bay of Biscay . . . a gully or canon . . . penetrates close up to the shore at Cape Breton, where, in former

times, the river Adour entered the sea" (p. 223). In the late Prof. Suess's great book, *Das Antlitz der Erde*, Mr. Buchanan's work is briefly discussed (cf. English edition, vol. ii. p. 548). In the French edition, but not in either the original German or in the English version, a footnote is inserted saying that the gully mentioned by Mr. Buchanan is the "Gouf de Cap-Breton" (the local name), while a sketch-map is also given (t. ii. p. 855). On the basis, it would appear, of this map, a further step is taken in various other scientific books, notably in Haug's *Traité de Géologie*. Here we find (vol. i. p. 483), in a discussion of the Continental Shelf and its mode of origin, the statement that the Cap-Breton fosse is nothing but the former bed of the Adour, with its affluents. Commandant Ch. Gorceix has carried out a research on the subject recently, the results of which are summarised by him in *La Géographie* for April 1922, and regards M. Haug's statement as wholly unwarranted by the facts.

The submarine valley lies some nine or ten miles north of the present mouth of the Adour, and extends at a right angle to the straight shoreline of the Landes, in a region where the coastal currents are constantly transporting sand southwards. Two problems therefore arise in regard to it—(1) to what cause does it owe its origin? (2) how is it that it is not in process of being silted up? That the sand, so freely transported in this region, does not reach the submarine valley, is shown by the fact that two sets of soundings, taken at an interval of nearly forty years, show precisely the same depths, while in the immediate vicinity rapid deposition is taking place. It is noted also that the gully is not without human importance on this inhospitable coast, for the surface waters over it are always relatively calm ("eaux de salut" of the local sailors), while the shallower regions on either side are constantly stormy. It thus forms a means of approaching the coast.

In attacking the two problems mentioned above, M. Gorceix considers first the actual depth conditions. He points out that the sketch-map, upon which M. Haug apparently bases his deduction that the fosse is a submerged river valley, is deceptive, first because of its small scale, and second because of the way in which the submarine contours are drawn in. He publishes a detailed map which shows that the gully has nothing in common with a river valley. It shows rather a line of fracture, with depressions such as occur in karst regions. It seems to lie along the line of a great fault running through Barbotan, Dax, and Cap-Breton. There is every reason to believe that the sea-floor in the neighbourhood consists of nummulitic grits overlying clay-beds. The original fracture, he believes, permitted water to penetrate, hollowing out grottos, and carrying away the underlying clays so that collapse occurred. Probably the process was facilitated by the presence of beds of gypsum and rock salt, lying in a great basin, the eastern extremity of which is represented by the beds at Saubusse, Salies-de-Béarn, and Bayonne. The fact that silting does not occur has been explained on the hypothesis that a subterranean river of hot water, giving rise to the

bus gorge of Prechacq, Dax, and Saubusse, finally reaches the sea at the gully, and that the resulting convection currents prevent deposition. M. Dreyfus considers that this hypothesis is not proved and presents certain difficulties. It may be that the coastal sand-bearing currents pass between the head of the gully and the shore, for there is a gap between the two. Further investigation is necessary here; but that the gully was initiated by a tectonic cause, and owes its present form to submarine depression produced in the fashion stated, he has no doubt. Similar depressions occur off the north coast of Spain, and are assigned to the same cause.

The Shore-lines of Corsica.—During the latter part of the War that extremely useful publication, the *Revue de Géographie*, ceased to appear. We therefore welcome the recent appearance of vol. ix., which covers the years from 1916 to 1921. It contains a number of valuable articles, but we select for notice a morphological study of the Shore-lines of Corsica by M. Paul Castelnau. The article contains sketch-maps and illustrations, but, for reasons which may be readily grasped, has not the large-scale map necessary for clear comprehension. It must be supplemented by such a map before the somewhat close reasoning can be followed.

The treatment is exceedingly detailed, and before giving a summary account of some of the points brought out, it may be well to indicate the general importance of the theme. Most text-books of physical geography include a highly generalised treatment of shore lines, usually accompanied by an outline classification based upon the known or assumed mode of origin. It is not uncommon also, in the more advanced geography examinations, to find questions set which involve a similarly generalised treatment of particular coast-lines. Now it is obvious, in the first place, that it must be at least rare to find a shore-line which owes its present form to one set of causes alone. Further, while in the case of land forms, regional studies have now become so numerous that the careful student can readily supplement the generalised statements of the text-book by a detailed study of a particular example, regional studies of coasts are few. It is these two facts which make M. Castelnau's work important.

As he points out, even a general survey of the island of Corsica on a map of moderate scale shows at once the striking contrast between the eastern and western shores. The former is flat, straight, and shows clear signs of the predominance, at the present time, of deposition. The latter is not only deeply indented by the four great bays, but is steep throughout and shows in its minor bays and inlets clear signs of active marine erosion. Again, on the west the continental shelf is at best very narrow, the continental slope is extremely steep, and depths of more than two thousand metres are found near the coast. But on the east there is a distinctly marked continental shelf, the slope is much more gradual, and the Tyrrhenian Sea, in the latitude of Corsica, scarcely sinks to one thousand

metres, and this at a considerable distance from its shores. It would appear, therefore, that it might be said at once that the contrast between the two shores is due to tectonic causes, to the characters of the *horst* represented by the platform which bears Corsica and Sardinia. But the form of the present western coast cannot be wholly explained as a result of the way in which the old land-mass of Tyrrhenis foundered to form the Tyrrhenian Sea. This coast as a whole, and its four great bays in particular, certainly bear the imprint of the original dislocation, but the details are regarded as due to a process of evolution which can be divided into two stages. There was first a rise of sea-level, followed by a period of marine erosion. The latter has been influenced by the land-forms, and by the nature of the rocks, especially the contrast between the harder ones such as the granulites and the softer granites ; many detailed examples of this are given.

Of the four great gulfs, that of Porto is regarded as preserving most nearly the form given by the original dislocations, with the result that its shores are the most inhospitable in Corsica, offering no sites for ports. The absence of secondary change here is due to the fact that the mountains approach the sea closely, and the submarine slope is exceedingly steep ; thus no minor change in sea-level would have any great effect in altering the form of the coast, for there are no open river valleys which could be flooded by the sea, no shelves to be silted up. Further, the coastal rocks are almost uniformly hard, rendering any selective attack by the waves almost impossible. Elsewhere the modifications have been extensive, and the author especially considers in detail the debated question whether Corsica does or does not display typical rias. The question is again bound up with the wider one whether rias can occur in tideless seas. M. Castelnau believes that his observations show that rias, though on a small scale, were formed in Corsica with the rise in sea-level already mentioned. But in the absence of a tide, silting up was rapid, and rias must therefore be regarded as ephemeral in such seas. In Corsica the small ria of Figari, in the south-west, is a partial exception ; but this is due to the fact that the river concerned has a small catchment basin and, owing to the dryness of the local climate, a very small flow.

These summary notes may serve to indicate the interest of the paper. We need only add that there are a number of incidental notes on the bearing of the facts described on the human geography of the island.

The Port of Varna.—In the *Annales de Géographie* for May 15 last, M. Jacques Kayser gives an account of the Bulgarian port of Varna, both in the past and the present. The note on developments since the year 1912 is especially interesting. Before the Balkan Wars the port was in direct competition with the Rumanian river ports and also with Constantsa. The Bulgarians, in order to promote the interests of their port, were anxious to construct a bridge across the Danube, between Giurgevo and Ruschuk, with the idea of diverting traffic from Constantsa.

This was opposed by the Rumanians, who suggested as an alternative a bridge between Kalafat and Vidin. This would not have benefited Varna, but would have tended to divert traffic to Salonika, via Sofia, Kustendil, and Skoplye. As a result of the Second Balkan War, Bulgaria lost the Bulgarian Dobruja, thus cutting off part of the hinterland of Varna, while at the same time she obtained Dedeagatch as an outlet on the Aegean. The presumption was, therefore, that Varna would decay, and Constantsa obtain part of its trade. Finally, as a result of the Great War, Bulgaria lost the Aegean coast which she had acquired in the Balkan Wars, thus accentuating the importance of Varna as her chief outlet. During the War Varna proved of little importance; its chief trade was an export of food to Constantinople. Since the War its trade is much diminished as compared with that of 1911, but, rather curiously, the existing trade is chiefly carried on with Czechoslovakia. Bulgarian cereals are loaded on Italian ships and carried to Trieste. The return cargo consists of sugar and manufactured goods for Sofia and the interior. In 1920 the imports were 70,000 tons, and the exports only 27,000 tons. But the Western Powers generally are beginning to appreciate the fact that the country is agriculturally rich and has a hard-working peasantry, and that the export of cereals from Varna is likely to increase in the future. The existing trade with Czechoslovakia via Trieste is very interesting. It is doubtless due both to the frontier changes and to the disorganised state of the railways in Central Europe; for it was a feature of pre-war Balkan traffic that cereals were usually exported by sea and manufactured goods imported chiefly by rail from Central Europe.

The Climate of Albania. During the War the Austrian authorities established a meteorological organisation in all the military zones. In the Balkan area Mr. Viktor Conrad was in charge of the network of weather stations, which extended from the Danube on the north to the river Semeni in Albania on the south. He discussed the Serbian observations in a paper published during the War which has not reached us. But a paper discussing the available climatological data for Albania, Montenegro, and the Sandjak of Novibazar, forming an excerpt from the *Sitzungsberichten* of the Academy of Sciences of Vienna, 1921, has been sent to us, and contains some interesting points.

Mr. Conrad states that the actual period of observation in the stations under his charge was only from June 1917 to September 1918, or rather more than a year. Under ordinary circumstances such sets of figures would not be regarded as of much value. Two circumstances, however, lead him to believe that the observations, despite their limited nature, are worth publication and discussion. The first is that the war figures can be supplemented by long-period figures obtained at certain stations maintained by the Meteorological Institute of Vienna in earlier days. Secondly, his experiences, alike in Albania and in Montenegro, lead him to believe that the time when a properly equipped meteorological institute will be set up in either country is somewhat remote.

He presents his paper, therefore, as merely a contribution to the climatology of a belt of land which has as yet been studied with care only during a one-year period.

The points of most general interest which seem to us to emerge from the paper are the notes on the climate of Albania, which the author regards as a peculiarly unfavourable one. In the plains the January mean temperature is well above freezing-point, and the July mean varies between 75° and 80° F. But for visitors from Central Europe the summers are trying out of all proportion either to the mean temperature or the extremes. The explanation appears to be that the hot spells are long continued. The thermometer remains steadily high, during the night and in the early morning as well as during the day, and this has a very enervating effect on strangers. The annual rainfall in the plains varies from about 43 to 63 inches per annum, but the distribution is such that there may be said to be at least an approach to alternating wet and dry seasons. The maximum fall occurs in late autumn and winter, with a secondary maximum about March. Little rain falls during June, July, and August, July being almost rainless. The heavy autumn and winter rains come in great downpours. The result of these conditions is that in summer, save where there is protection from wind and natural or artificial watering, the vegetation is burnt up, and the whole country desert-like. The watered lands with their rich southern vegetation then appear like oases. The heavy rains of November, again, falling on the parched and dried land result, especially on slopes, in rapid denudation of the surface soil. Finally, swamps are widely developed in the lower grounds, and the mosquitoes which breed in these disseminate the worst form of malaria, so that the author is justified in saying, "from the climatic point of view, Albania cannot be described as a happy land."

Africa.

Abyssinia and the Abyssinians.—In the *Geographical Journal* for June last, Mr. C. F. Rey gives some account of present-day conditions in Abyssinia, based upon a stay in the country. It is estimated—though Mr. Rey believes that the figures are too high—that the empire contains about eleven and a half million persons, of whom rather less than three and a half millions are Abyssinians. These Abyssinians are Monophysite Christians and are strongly attached to their religion. There are many priests and the country is dotted with churches, monasteries, and convents, but the priests are ignorant, and in the country as a whole few people can read, and fewer still write. The Abyssinians occupy about one-third of the country. Of the other elements in the population the largest is the Gallas, found mainly in the south and west, and estimated to amount to nearly six millions. The rest of the population consists of Danakils in the north-east, Somals in the east and south-east, and various negroid races in the north-west. The last, together with some of the Gallas, are pagans, while the other Gallas, the Somals, and

Danakils are Moslems. Jews are also present. The Emperor Menelik imposed forcible conversion to Christianity upon many of the Gallas in the conquered lands; but among these "converts" Islam would appear to be making progress, as it is also among the pagans. The Abyssinians themselves, except under stress of war, make little attempt to proselytise, and foreign missionaries are not encouraged. The Moslems, however, are very active in propagating their faith. The whole country is in an exceedingly backward state, and appears to have degenerated greatly within the last fifteen years—that is, since Menelik's illness and subsequent death. The railway, which reached Addis Ababa in 1917 from Jibuti, has done relatively little to open up the land. It runs for much of its course through unproductive country, and the Danakils are very troublesome, destroying telegraph lines for the sake of the copper wire, and the permanent way for the sake of the fish-plates and other steelwork. The country is also practically self-supporting, so that there is little opportunity for trade. Apart from the railway, transport presents great difficulties. Near the city ox-wagons are used, elsewhere mules or human porters have to be employed. Of the natural resources of the country, however, Mr. Rey thinks highly. The climatic conditions on the main plateau he regards as ideal, and he notes that the Abyssinians appear very intolerant of the lowland climate of the Nile area, so that they seem confined by nature within their mountains. A great variety of crops can be cultivated, and cattle, sheep, and goats thrive well. It is believed also that mineral wealth exists, though this has not as yet been proved. The Abyssinian jealousy of foreign interference and the rivalries among the Powers have hitherto been great obstacles to progress.

Polar.

The Second Danish Thule Expedition.—Under the title of "Stratigraphy of North-west Greenland," Mr. Lauge Koch has published a preliminary paper on certain of the results of the Second Danish Thule Expedition, which in the years 1916-18 travelled from Upernivik along the north-western and northern coast of Greenland as far as Lockwood Island. The paper, which is in English, is from *Meddelelser fra Dansk geologisk Forening*, v., and is illustrated by a geological map of north-west Greenland, and a number of figures. The geological details are beyond our scope, but the point of special interest is that Mr. Lauge Koch has been able to confirm a suggestion put forward by Nathorst in 1910, that the submarine ridge which extends from north-west Spitsbergen towards Greenland, and separates the Polar basin from the Greenland Sea, indicates an extension of the great palaeozoic fold of Spitsbergen into Greenland. In other words, Mr. Lauge Koch has proved that the Caledonian Mountain Chain, hitherto recognised only in Scotland, Scandinavia, and Spitsbergen, extends also along the whole of the north coast of Greenland and the western side of Grinnell Land.

The ancient mountain attains its maximum height of about 2000 metres (about 6500 feet) in northern Peary Land, and is being much modified by the action of ice. In contrast to north-western Scotland no thrust-planes have been observed, a fact which it is suggested may be explained on the hypothesis that the Greenland fold is the northern tapering part of the Caledonian fold.

General.

Ascension Island.—It is announced that this small rocky island has been annexed to the colony of St. Helena, and its administration has been transferred from the Admiralty to the Secretary of State for the Colonies. The personnel of the small naval station hitherto maintained in the island has been withdrawn.

EDUCATIONAL.

The Scottish Central Library for Students.—We have received a copy of an address with this title, delivered on June 7, 1922, before the Scottish Library Association by Lieutenant-Colonel J. M. Mitchell, O.B.E., M.C., M.A. To the address in its printed form is added a prefatory note and an appendix, the whole being published by the Carnegie United Kingdom Trustees at Dunfermline.

The Scottish Central Library for Students was established by the Carnegie Trustees in the autumn of 1921 in order to attempt to meet the needs of serious students in rural districts. After a year's trial it was decided to extend the operation of the scheme over a wider area than was at first contemplated, so that at present any reader is eligible who resides in Scotland outside those cities, burghs, or parishes in which a public library rate is levied. Colonel Mitchell's address is devoted to an exposition of the scheme and of the need for it, while the Appendix contains a list of books asked for by rural readers during the first ten months of its operation, the books being classified according to subjects. The arrangement brings out some interesting points, and we are glad to note that a fair number of authoritative geographical books are in circulation in rural Scotland under the scheme.

Gilchrist Studentship in Geography.—We are informed that the Gilchrist Trustees again offer, for 1923-24, a studentship in Geography of the value of £80, which may be increased somewhat, but not so as to exceed £120. The studentship is tenable at any recognised school of geography. Applicants, who should be teachers with at least two years' experience, should send in their names before the end of January 1923 to Professor L. W. Lyde, University College, Gower Street, W.C. 1, giving references and a full account of their previous work, together with three testimonials.

Regional Survey in Scotland.—Last spring the Scottish Regional Survey Association held a successful conference for teachers and others at the Outlook Tower, Edinburgh. The Association has also published a small pamphlet, called "The Regional Survey Method in Education," which includes two papers by practical teachers indicating how the study of the local region may be carried on in school, and stating some of the results which have been obtained. The pamphlet, which contains also a prefatory note by Mr. F. C. Mears, and an article on a proposed regional survey of the play of children by Dr. Charles Forbes, can be obtained at the Outlook Tower, price 6d.

The Readership in Geography in Edinburgh University.—It is announced that Mr. Geo. G. Chisholm, M.A., B.Sc., who has held the post first of lecturer and subsequently of Reader in Geography in the University of Edinburgh since the institution of the lecturership in 1908, is resigning his appointment at the close of the present session. The lecturership in geography at Edinburgh University was the first to be established in Scotland, and its institution was largely due to the persistent efforts of the Royal Scottish Geographical Society, and especially of the late Dr. J. G. Bartholomew. It was followed by the establishment of a lecturership in Glasgow University in 1909, Capt. H. G. Lyons, R.E., F.R.S., Hon. D.Sc. Oxford and Dublin, being the first lecturer there. Upon Mr. Chisholm thus fell the burden of first organising geography courses of degree standard in this country, while recently (1918) a diploma in geography has been instituted. On behalf of the members of the Society we wish to express our cordial thanks to Mr. Chisholm for the work he has done for geography in Scotland.

NEW BOOKS.

EUROPE.

Evolution of the Essex Rivers and the Lower Thames. By J. W. Gregory, D.Sc., F.R.S., Professor of Geology in the University of Glasgow. Colchester: Benham and Co. *Price 2s. 6d.*

In his Introduction to this pamphlet Prof. Gregory tells us that it was the problems presented by the rivers of Essex which first led him to the study of geology, and since his early investigations he has frequently returned to field work in the region. His title is perhaps not sufficiently comprehensive, for in addition to a discussion of the reasons for the anomalous courses of the rivers, the booklet contains sections on various controversial topics, such as the question whether man was or was not an inhabitant of Essex in pre-glacial times, and the mode of origin of the Essex Boulder Clay. While the contents are too purely geological for summary here, we may say that the pamphlet in itself and in its list of references is of much value to those interested in the various problems presented by the county of Essex. The sketch-maps and diagrams are, however, somewhat crude, and there appears a little uncertainty as to the nature of the audience addressed. In places quite elementary geological conceptions are treated of in some detail,

while elsewhere the reasoning is close and demands a fair acquaintance with the subject before it can be followed.

In a Russian Village. By Charles Rodin Buxton. London : The Labour Publishing Company, 1922. *Price* 2*s.* 6*d.*

Mr. Buxton was in Russia in 1920 as Secretary to the British Labour Delegation, and, after his official duties were over, made an independent visit to the village of Ozero, east of the Volga, in the government of Samara. His pamphlet records his observations and experiences, and is presented as a first-hand contribution towards an understanding of the Russian people. Though slight, it is not without value from this point of view. It is, however, padded out with descriptions of very familiar facts, *e.g.* of the Russian peasant's mode of taking a bath, and the reports of conversations include the author's own contributions in full, both when these were questions of the ordinary interviewer's type and also when, cross-questioned in his turn, he gave personal details in regard to himself.

The Czechoslovak Republic. By Jaroslav Císař and F. Pokorný. London : T. Fisher Unwin, Ltd., 1922. *Price* 9*s. net.*

At present no country of Europe is more interesting than the land of the Czechs and Slovaks, restored to independence in 1918 by the break-up of Austria-Hungary and the indomitable patriotism of the nationals themselves. Every aspect of the new inland republic is dealt with by the authors, aided by specialists in history (President Masaryk), literature (Mr. Paul Selver), and music (Mrs. Rosa Newmarch). The volume, dated from London, has been printed in Praha (Prague), and misprints are commendably few. Many statistical tables have been included to show the resources and economic possibilities of the country, which was once the centre of Austrian industries. The authors hope that the volume "may be replaced by a more adequate and original work of some English student," but as it stands it is an excellent handbook containing adequate information for the British student or merchant, while for the geographer and politician the volume is of special value. There are many photographic illustrations ; that facing page 168 should perhaps be entitled "View of Prague from Hradčany."

The Cotton Industry in France. By R. B. Forrester, M.A., M.Com. Manchester : The University Press.

In this book, which forms one of the Gartside Reports on Industry and Commerce of the University of Manchester, Mr. R. B. Forrester, now Cassel Lecturer in Commerce in the University of London, gives us what Professor Macgregor in his Introduction calls "the completest study in English of the French cotton industry, admirable alike in its combination of descriptive and analytic treatment." It is true that the main interest of the book is economic, dealing as it does with questions of industrial organisation and trade policy, but there are many passages to which the geographer may well give heed. In the first chapter, for example, the geographical distribution of the industry is described, and there is an admirable discussion of the various geographic and economic factors which have led to its localisation in several fairly well-defined districts. The fact that none of these districts has the geographical endowment of Lancashire is one reason why the manufacture of cotton goods is not concentrated to the same extent as in England, but another factor is the tendency of the French genius for variety rather than for mass production. As a result we do not find the same develop-

ment of special skill among the operatives, and much of the labour which is employed is interchangeable with other textile pursuits and even with agriculture. The restoration of Alsace to France has made that country the largest cotton-manufacturing state on the Continent, and from this fact some difficult problems will arise when the factories of the north are once more in full working order. The French industry has in the past depended mainly upon the home and colonial markets, where it had the advantage of protective tariffs. But by the return of Alsace the spindles have been increased by about one-fourth and the looms by one-third, and it is difficult to see how the increased production is to be absorbed, especially as Alsace is likely to lose its former outlet in Germany.

Mr. Forrester writes with full knowledge of his subject, and his book will prove of value to many besides those who are directly concerned with the cotton industry. J. M'F.

L'Industrie du Fer en France. Par J. Levainville, Docteur ès lettres. Paris: Armand Colin, 1922. *Prix* 5 *frs.*

The author points out that important French ironfields occur in Lorraine, the west of France, the Pyrenees, and North Africa. He then discusses the smelting of the iron ore by means of wood and coke respectively. A special chapter is devoted to the "Iron Industry after the War," in which he states that "France has become, by the action of a war which she did not desire, the richest in iron of any Power in Europe. In the whole world she is surpassed by the United States alone. Her reserves attain 7 milliards of tons without counting the deposits in her colonies, whose reserves are considerable. On the basis of the extraction in 1913, viz. 43 million tons, her reserves will not be exhausted for 136 years, assuming the mines are not sunk deeper than 500 metres." The author considers that French iron should pay for the coal exported to France from Britain. He gives four good maps, and appends a Bibliography to each chapter of his useful little work.

Under the Acroceraunian Mountains. By Henry Baerlein. London: Leonard Parsons, 1922. *Price* 6*s.*

The general enthusiasm for small nations and for their right of self-determination has somewhat diminished since the later years of the war; this somewhat obscurely named book is thus not likely to arouse the emotions which it would have done a few years ago. It is primarily an attack on the Albanians, who are regarded by the author as, in their present state of culture, unfit for self-government. The particular problem under discussion is the fate of the region variously known as Southern Albania or Northern Epirus, which consists of the former Turkish sandjaks of Argyrocastro and Korytza (Koritsa). In 1919 it was decided by the Entente Powers that this region should be assigned to Greece, but in November 1921 this decision was reversed by the Ambassadors' Conference, and the area included in the independent Albanian state. Mr. Baerlein opposes this decision vigorously, and criticises in an unsparing fashion the statements made by the supporters of Albanian claims. His book is somewhat intemperate in style, and not without irrelevance and signs of hasty and careless writing. Only in the last chapter, entitled "The Prospect," can there be said to be much of direct geographical value, for in it the difficulties of communication between the two sandjaks and the rest of Albania are discussed briefly. But the book should be read by those who wish to form reasoned judgments on very difficult problems.

From Switzerland to the Mediterranean on Foot. By J. B. Winter. Illustrated. London : T. Werner Laurie, Ltd., 1922. *Price 5s. net.*

The first part of this little book records a walk in winter from Sierre to Cannes, much of which was along the well-known motor "route des Alpes." The second part describes some climbs in the Bernese Oberland and in the Zermatt district. It is quite unpretentious, but exceedingly pleasant and interesting, and we could have wished the first part at least to have been twice as long. The photographic illustrations are numerous and well chosen.

Hadrian's Wall. By Jessie Mothersole. London : John Lane, 1922. *Price 8s. 6d.*

Most people know that the Romans built two great walls across Britain. Many people have seen Hadrian's Wall, but comparatively few have troubled to walk along it from sea to sea ; or if they have, they left no account of their pilgrimage. Miss Mothersole says in the Introduction to her book that she was "inspired thereto by the example and record of William Hutton," who performed this feat in 1801 at the age of seventy-eight.

Miss Mothersole begins with a short historical sketch of the Romans in Britain at the time of the building of the wall. She then gives a description of the plan with its mile castles and wall turrets. Another chapter is devoted to the Vallum or ditch.

She began her walk on a May morning at 5 A.M., when she arrived in Newcastle from London. She went directly to Simpson's Hotel, Wallsend, and started back, following the wall's course through Newcastle, and then away west, through fields, villages, or towns, past farmhouses, along the edge of cliffs, across rivers, till she reached Bowness, where an old lady in a black sun-bonnet told her the wall ended in her garden "just behind the apple tree." It was 73½ miles direct, but many digressions to see antiquities of interest made it much longer. The whole walk occupied a week.

The book is a most admirable guide-book to any one visiting the wall and its neighbourhood, but it is also very amusing reading, for the pedestrian describes her personal adventures with great humour, from the kindly postman who treated her to a glass of milk, to the ex-service man who knew of a Roman stone in a certain garden with a "terrible far back date ; anyhow it was A.D. something." The book is well illustrated by the author's own sketches, and it also has several excellent maps and plans.

ASIA.

The Sea-Gypsies of Malaya. By W. G. White. Illustrations and Maps. London : Seeley, Service and Co. Ltd., 1922. *Price 21s. net.*

Comparatively little has been written about the Mawken or Selungs of the Mergui archipelago in Lower Burma. This race of nomadic sea-gypsies spend the greater part of their life in boats among the sheltered waterways of this archipelago of over 200 islands, which stretches through about five degrees of latitude. No important trade routes touch these seas, and the narrow strip of British Burma off which the islands lie attracts little attention. Mr. White spent some time among these people and took great pains to learn their language. He was also commissioned to take a census of them in 1911, which gave him many chances of studying these shy and primitive folk at close quarters. As a result of his investigations Mr. White estimates the number of Selungs at about 5000, and he believes that all former estimates were too low. The writer of this notice put

these numbers at 900 in 1907, and the enumerators of 1881—also an estimate—gave 865. Few authorities have put the number above 1000. There is certainly no evidence that the race is dying out, although, unless they are protected and allowed to develop on their own lines, the Selungs will probably be absorbed in time by the Chinese, Burmese, and Malays. As growers of rubber and coco-nuts Mr. White foresees a future for these people, free from their normal state of fear and want.

The origin of the Selungs is obscure. They are generally held to show Malay relationships, although their tradition is that they entered the archipelago from the north, not the south. Mr. White gives no new facts bearing on this problem and took no anthropological measurements. A few figures, however, have been published and these appear to suggest relationships with the Nicobarese and Andamanese. Mr. White gives reasons for believing that the Malay affinities of their language are due to recent adoptions. The name Selung is Burmese; Mawken, which "means sea-drowned," is the name the sea-gypsies use for themselves. They are said to have adopted this nomadic boat-life as an escape from Malay raids on their settlements. Such acts of piracy were not unknown some few years ago.

Mr. White describes the curious *katoi ka-* or devil-posts on Dala or Cantor Island. They are two crudely decorated wooden posts; the third one seems to have gone. According to Mr. White they indicate that the island is under the protection of a kindly spirit. An earlier version of these figures, which Mr. White does not quote, is that they represent Thida, the supreme spirit of the Selungs, who took a material form many years ago on the departure of missionaries who spent a short time among these people. That story was certainly current fifteen years ago and Dr. Anderson heard it in 1882, while it is not without significance that the name Thida is a Siamese word of comparatively recent introduction to the Selungs. Thida is held to be a good spirit who does no harm, and so can be ignored, and is never worshipped.

Although he is a little prone to moralise at times, Mr. White writes with knowledge and a real sympathy with the Selungs. Incidentally the book would have had more colour if the beachcombers, pearlers, and arrogant Japanese divers had been admitted to its pages. They take no mean part in the life of Mergui and its archipelago. But we are given a vivid study of an astute old Chinaman, Maung Shwee Ee, who for many years has been the leading merchant in Mergui. The book is not only interesting; it is a notable contribution to anthropological and geographical literature of permanent value. It certainly merits a better map. Lastly, it may be possible to defend the use of the term Malaya in the title, but it is unusual to include Burma within the scope of that name. R. N. R. B.

Beyond Shanghai. By HAROLD SPEAKMAN. New York: The Abingdon Press, 1922. *Price* 16*s*.

With no pretension to serious geographical research, but simply by narrating his travels, chiefly in that best of all conveyances a Shanghai house-boat, Mr. Speakman has put together the materials of a very dainty and charming book which it has been a pleasure to the present reviewer to read. Mr. Speakman went to China chiefly to paint, and to study the ways of the people, and he travelled contentedly in Chinese fashion, either in his house-boat or as a steerage passenger on the river steamers, putting up at native hostelries, boarding in native houses, and living on native food; all of which proceedings must have called for a good stock of courage and determination on the part of a new arrival who was accustomed to a European standard of living. The everlasting *din* of Chinese

surroundings, with the utter lack of privacy, are in themselves sore trials to Western ears and nerves. The eight illustrations in the book are from paintings by the author, and he has been successful in conveying something of the atmosphere of Chinese scenes. For a specimen of Mr. Speakman's pen pictures, we quote from his description of a temple on Pu-tu-shan, "the island of Buddha," not far from Ningpo :—

"Two bridges spanned the great mirroring pool which lay before the wall. The Lion Bridge—so named because of fifty stone lions along the balustrades—rose gracefully in a high white arch over its reflected curve in the water below. . . . Passing through the outer gate, one entered a different world. Golden tiles, glowing under the last shafts of the sun, flamed half-hidden amid the dark foliage of mighty trees. Indigo shadows, moving with splendid majesty, passed slowly across courtyards where ancient bronze braziers exhaled sinuous lines of blue, curling incense against sun-flecked walls. . . . Beyond the court gleamed dusky-colourful interiors—dim corridors where immobile rows of great golden gods and lohans sat in their perpetual twilight. Countless gray-robed priests passed in solemn procession, while in a vast dining-hall five hundred silent itinerants received their frugal meal from their silent hosts. Over all lingered the recent memory of that vivid throng of gaily dressed pilgrims—transient and ephemeral wraiths—bearing sticks of smouldering incense and flitting like butterflies before the inscrutable gods of wood. Gautama, the Light of Asia, returning to stand there (even as Confucius before his great temple in Nanking) must surely have felt its charm."

Mr. Speakman is, perhaps, a little out in estimating the number of Chinese written characters as high as 40,000. Half of that would be nearer the mark, and to use 10,000 requires an education beyond the average. We think also that Mr. Speakman is incorrect in saying (page 122) that the Chinese word for "home" is made by putting the character for "pig" under the character for "roof."

A Geography of the Bible. By E. K. Howarth. Oxford : At the Clarendon Press, 1922. *Price* 2*s. net.*

This small text-book gives a clear account of the world of the Bible from Egypt to Persia. The story of these lands is well told, and we are sure that not only teachers in day or Sunday schools, but very many others, will find that the book fills a gap in their shelves. As a companion to Bible study it is indispensable and forms an excellent introduction to Sir G. A. Smith's classic work on this subject. The chapter on Egypt requires minor corrections and the Nile does not rise in the Abyssinian highlands. Sketch-maps on the cover pages and about twenty reproductions of photographs taken throughout the area complete a piece of work for which there should be a distinct demand.

La Syrie. Par Dr. George-Samné. Préface de Chekri Ganem. Paris : Éditions Bossard, 1920. *Prix* 48 *fr.*

This bulky volume, which contains well over 700 pages, is by a Syrian who holds the post of General Secretary to the Central Syrian Committee. This committee apparently takes a very large view of the boundaries of Syria, for we are told that the country not only includes Palestine but also the sandjaks of Diarbekr and of Mosul. The book, which is well illustrated with sketch-maps and from photographs, contains chapters dealing with the geography of the whole region, more especially its agriculture and the development of means of communication. For the most part, however, the volume is political and historical, dealing especially

with recent events and with the future regime of the country. A draft constitution is given for a future federated republic of Syria, to be guided and supported by France, and British policy comes in for some severe criticism. Politics in the Near East have undergone many changes since the book was written, and in any case most of its contents lie outside our scope. On the other hand, the purely geographical sections contain much useful information, with statistical details of a kind not otherwise easy to obtain.

AFRICA.

The Sudan in Evolution: A Study of the Economic, Financial, and Administrative Conditions of the Anglo-Egyptian Sudan. By Percy F. Martin, F.R.G.S. With a foreword by Gen. Sir F. Reginald Wingate, Bart. London: Constable and Co., Ltd., 1921.

Mr. Martin's book is the outcome of an extensive tour through the Anglo-Egyptian Sudan in 1913, but the outbreak of the war prevented its earlier publication. He writes from the point of view of a journalist who has described various other regions, and the book is meant for the general intelligent public rather than for the specialist. To obtain a clear conception of the geography, ethnography, social and industrial conditions, and of the great task of governing this vast flat territory, the writer penetrated far from the beaten tracks, into the interior. He moved away from the haunts of white man, traversing hundreds of miles of hot waterless desert on camel-back, and collecting information at first hand in all sorts of remote places and on a great variety of subjects. The history of the Sudan is epitomised, and it is well that the public at home should be reminded of the unspeakable misery and the appalling atrocities that the wretched Sudanese had to endure under the former Egyptian and the Mahdist régimes, before the British occupation brought security and peace to the decimated population, a quarter of a century ago.

The country had no legitimate trade whatever before 1898-9, when the British rescued the Sudan from the bane of Mahdism, most of the exports being "ivory" both white and black, especially the latter variety. Gradually and steadily trade has revived and increased. In 1907 the exports were £ E,449,329, and by 1918 this figure had swelled to £ E 3,923,711 by steady advances each year. The imports have increased correspondingly. The Sudan is not a place for settlement by Europeans, and its resources can only be developed by native labour acclimatised to tropical conditions. It is a land adapted for cotton growing, with a deep rich soil and a hot moist atmosphere during the period of greatest growth and drier air during the ripening time of the crop. There is an abundant and fairly cheap supply of labour, although the Sudanese are less industrious and efficient than the Egyptians.

Mr. Martin discusses many topics, and in a book written by a chance visitor a few mistakes are inevitable. At p. 489 it is stated that some unruly natives were controlled by a contingent of the Gordon Highlanders. This is a mistake, since neither these nor any other British troops have ever been employed in Mongalla Province, where the disturbance took place. The Dinkas, we are told, are now permitted to carry arms. They have always carried arms and never ceased to do so. On p. 491 it is stated that the modern town of Mongalla is on the *west* side of the Nile. This is an error, and *east* should be substituted for *west* to be in accordance with facts. In chapter xix. the author seems to have been offended by Indian civilians in the P. & O. steamer to Port Said, and he goes out of his way to bestow, on what he describes as a supercilious class, a four-page castigation

which to the uninitiated reader appears rather misplaced in a book of this kind. The copy sent for review has no map, and without a map it is not possible to grasp the subject adequately. A few illustrations would likewise have made the letterpress more attractive. This is, however, a useful compendium which all intending travellers to the Sudan would do well to consult for the sake of the variety of its information and the hints as to outfit, etc., that are provided.

The New Zambesi Trail. By C. W. Mackintosh. Illustrations, Appendices, and Maps. London: Marshall Bros., Ltd., 1922. *Price* 10*s.* 6*d. net.*

Miss Mackintosh, a niece of François Coillard, one of the noblest of African missionaries whose name will long be remembered in Northern Zambesia, has written a charming account of two trips in South and North-West Rhodesia, in 1903 and 1920 respectively.

The 1903 trip was made under her uncle's protection, and the reviewer, who covered much of the same ground shortly before, can testify to the accuracy of the description with its poignant word-pictures, recalling pleasant memories of the rough, but fascinating, days of African travel of long ago.

The 1920 trip was carried out under the aegis of the Paris Evangelical Mission, and gives an account of the Society's work in Barotseland, interspersed with a generous and humorous description of the country and natives, in which Miss Mackintosh's able powers come into full play.

The whole makes entertaining reading, and the author is to be congratulated on producing an excellent book. H. R. W.

In the Heart of Bantuland. By Dugald Campbell, Fellow of the Royal Anthropological Institute. London: Seeley, Service and Co., Ltd., 1922. *Price* 21*s.*

This fascinating study of one of the great races of Africa bears the stamp of an accomplished anthropologist and keen observer, who, during his twenty-nine years' pioneering experience, has crossed the Dark Continent from one side to the other on three different occasions. Beginning with his first trip in 1892 from Benguela, which port is superseded by Lobito Bay, one of the finest seaports in Africa, the author takes us by one of the two great caravan routes into the interior, via Bihé and Msidi's—the red road, as Livingstone called it. Slavery was rife, and the vivid picture unfolded before us makes us realise what the native meant by "going west," in other words, being captured by the slavers, taken to the West Coast or "Dead Man's Land," and sold.

One is struck with the enormous ramifications of the Bantu race, with its 50,000,000 members, who cover one-third of the African Continent; there are two hundred and seventy-six known languages among them, and hundreds of tribes, occupying fully two-thirds of the continent from the Cape to the Niger River in the north and the Atlantic and Indian Oceans, use Bantu speech in one or other of its forms. It is amusing but nevertheless true that some of the natives trained at the various missions speak their own dialect with a Scots accent. Fetishism holds absolute sway over the native with its fear of the unknown and unseen. Take, for example, a native who could face a lion or other wild animal single-handed, yet on hearing the rustling of a leaf at night in the forest, or some such trivial thing, would turn back, consult the doctor or "Man from Below," who prepares a fetish to counteract and prevent the evil of the omen.

The heart of the Dark Continent is changing rapidly. Instead of the gun which ruled in Livingstone's day we now have the railway and motor. Prior, however,

to the advent of the European, town planning and sanitation, about which we speak so much to-day, were in vogue among the Lubans.

One is apt to look upon the native as a "raw jungli," but we find his whole life is bound up in convention as intricate, if not more so, than our own. Take, for instance, his laws in regard to land, property, inheritance, assault, secret societies, and guilds. The chapters on Totemism, Exogamy, and Taboo make interesting reading. Something more might be said about the musical attainments of the various tribes, such as the Awemba, Chikunda, and no doubt many more. In the chapter on native dress and habits reference is made to the lip ring or "pelele," said to have been worn by women in some localities to give them an ugly appearance and so escape the slaver, who looked upon beauty as an asset. In some parts, however, at any rate in Nyasaland, it was favoured by the older women as a sign of beauty, but the younger generation have given it up, as it imparts anything but a prepossessing appearance.

The story of Katanga, the rich copper country, and how it came to be annexed to the Congo Free State in 1892, during the partition of Africa, is very interesting. The book finishes with a chapter on the early days of North-East Rhodesia, giving the names of several well-known pioneers, some of whom have crossed the Great Divide, leaving it to others to carry on the work of African development. The author puts very tersely his views as to how this can be done:—"The native is, I believe, the one and only permanent asset of Africa, and the future progress and peace of the country depend largely on the intelligent understanding and just treatment of the Native Races."

The book is written by a master in a lucid manner, and with its index, illustrations, and excellent map should take its place among other well-known works on Africa and the African. J. G. M. B.

AMERICA.

The Conquest of New Granada: Being the Life of Gonzalo Jimenez de Quesada. By R. B. Cunninghame Graham. London: William Heinemann, 1922. *Price* 15*s.*

Throughout this book there is frequent comparison with the conquests of Peru and Mexico by Pizarro and Cortes. In the prominence of the state that was founded the results to-day are not alike, for the Republic of Colombia, as New Granada has come to be called, cannot rank beside Peru and Mexico. Yet in all that makes adventure great, in courage, endurance, leadership, and humanity, Quesada may well claim a place beside his better-known compatriots.

The perils and hardships of his band during their nine months in the noisome forests of the Magdalena were extraordinary, and when at last they rested on the upland plains, the 1000 men he had commanded were reduced to 169. It was only iron resolution and power of command that could have brought them through such a racking experience. An illustration of this authority is the execution of a soldier who in desperation had killed one of their precious horses for food, and in this instance, as almost always, Quesada's judgment was correct. When all their leather accoutrements had rotted away and their rusty swords broke in their hands, it was to the horses that they owed their success.

The territory seized on this first conquest was some 600 leagues in area and thickly populated, though civilisation had not advanced so far as it had in Peru and Mexico. It is disappointing even to the reader of to-day to find how often, when they seemed so near their reward, the treasures they sought were removed from their grasp—by the rightful owners, it must be admitted. For it was the

lure of gold, and only in the second place the desire to spread their own faith, which inspired these doughty adventurers. Still, their achievement was a substantial one, and in his old age their leader was able to dwell in honour among his fellow colonists and to feel that the foundations he had laid were enduring.

In his English chronicler, Quesada has found some one specially qualified for the task by his knowledge of the language and of the country. Mr. Cunninghame Graham can pen sunny pictures of the varied scenes, the plains, the passes, horses swimming a river, etc. And if "As patient as an Iona cross under the Highland rain" is not a Spanish saying, there are plenty of sayings that are. The account he gives of native superstitions affords him an opportunity for sardonic humour, but in general his writing is simple and clear, and touched with the enthusiasm which suits the narrative of such daring deeds. We may note that it is difficult to reconcile the age of Quesada at various periods with the date given for his birth.

The Real South America. By Chas. Domville-Fife. London: Routledge, 1922. *Price* 12*s.* 6*d. net.*

The author says "there are two South Americas." One is the vast fringe of cosmopolitan civilisation round the littoral of an almost unknown continent; the other is a land of dreams wherein foreign financiers build fortunes while adventurers dabble in volcanic politics. The great cities are in the former, and he begins with Buenos Aires, "a luxurious and somewhat immoral metropolis" with a population of 1,700,000. "Money is made easily and spent quickly." A description of the sights of the town is given.

The next city mentioned is Rio de Janeiro, "the most lovely capital in the world." On the Pacific Slope is Valparaiso, the Liverpool of the South Pacific. Callao is a busy seaport, and Lima is one of the prettiest capitals of South America. The author says that "Maté is the chief beverage of many of the South American countries. It is inexpensive and so nutritious that by means of its use the cowboys of the plains are enabled to ride from sunrise to sunset without any desire for food, their only meal being taken in the evening." The maté tree is usually from 15 to 18 feet high, and from its leaves a powder is made which, when infused, furnishes a far more stimulating beverage than tea. The author describes the tableland of Bolivia, which has an area of 66,000 square miles at 12,000 feet above sea level, as "one of the wonder regions of the earth." His book is illustrated with maps and pictures, and is written in a lively and attractive manner.

Mexico and its Reconstruction. By Chester Lloyd Jones. New York and London: D. Appleton and Co., 1921. *Price* 18*s.*

The main purpose of this work by a former Professor of Political Science in the University of Wisconsin is to provide an outline of the problems which will have to be faced by the Mexican Government in its efforts towards post-revolutionary reconstruction. But, in the view of the present writer, it is erroneous to speak of "reconstruction" in Mexico in the manner that it might be applied to an Old World civilisation. The Diaz period was in reality merely a lull in a revolutionary tempest which had raged almost without cessation since the subjugation of the country by Cortez, for at no time since the Spanish conquest has Mexico been altogether at rest. Diaz and his Cientificos maintained the semblance of order by a system of severe repression, and, it is now known, by local reprisals of the most inhuman kind. In speaking of Mexico, then, with its numerous races—for Nahua, Otomi, Zapotec, and Tarahuamare are as different in language, manners,

and customs as, say, the peoples of Indo-China—we should bear in mind that this enormous peninsular tract, ten times larger than England, is still on the anvil of nation-making destiny and can scarcely be regarded as the home of a homogeneous race with a definite national outlook. In short, everything in Mexico, racial, political, commercial, is not so much in the melting-pot as in the original crucible.

Mr. Jones has much to say about foreign capital in Mexico. But that has, almost since the first, been poured into the country in a manner so rash and short-sighted as to be amazing. Even at the beginning of last century the British capital which found its way into Mexico could be counted in millions. The native statesmen borrowed as wildly as our financiers lent. The idea that Mexico is a Golconda seems to have become fixed in the British imagination at a very early period indeed. But the people of the United States are now the principal investors, and in this book the present nervousness of American speculators is sharply reflected. On the Mexican side there has been a lack of enterprise typically Iberian; on the American real "hustle," but quite as much "graft." Bluff has been met with heroics. To a mere European with a sense of humour the present situation in Mexican oil would be delicious as a farce were it not deplorable as an exhibition of strained and tortured ethics.

Mr. Jones's book is accurately informed as regards Mexican conditions, and he has striven to be just. But the plain truth is that the American investing public has not in the past been well informed regarding Mexico, that it has been misled about the position there by its own company-promoters, and that it has not dealt quite fairly with an adolescent people, whom it should have tried to guide rather than exploit. Americans would do well to read Mr. Jones's book as an honest account of conditions in the Peninsula. It is an incisive, accurate, and wonderfully minute analysis of the whole Mexican structure, political, commercial, and industrial.

AUSTRALASIA.

The Conquest of the New Zealand Alps. By Samuel Turner, F.R.G.S. Illustrated. London: T. Fisher Unwin, Ltd., 1922. *Price* 21*s. net.*

Mr. Turner is an indefatigable climber, and has already published books on his adventures amongst high mountains in various parts of the world. So long ago as 1905 he lectured before this Society, giving a well-illustrated and vivacious account of his visit to the Altai Mountains. He has now been settled in New Zealand for a considerable time, and he has devoted several strenuous holidays to the Southern Alps. The devotee of Switzerland may perhaps be pained to learn that first ascents are by no means unknown in the South Island, and will be disposed to envy Mr. Turner those opportunities for exploration, of which he has undoubtedly taken full advantage. Mr. Turner's solitary ascent of Mount Cook was a wonderful, if unjustifiable, feat, but it is not enhanced by the absurd claim—despite Zurbriggen—that it is the first of its kind. We trust also that his example will not encourage other New Zealand climbers to walk alone over snow-covered glaciers. The book is exceedingly well illustrated and produced, and takes a distinctive place in the growing literature about the New Zealand Alps.

POLAR.

South: The Story of Shackleton's 1914-1917 Expedition. By Sir Ernest Shackleton, C.V.O. London: William Heinemann, 1922. *Price* 5*s. net.*

The original edition of this book was reviewed at length here, vol. xxxvi. p. 39, soon after its first appearance. This cheap edition will enable it to reach

a wider circle of readers, and its clear print and handy size, combined with the moderate price, are worthy of cordial commendation.

OCEANIA.

The Hill Tribes of Fiji. By A. B. Brewster, F.R.A.I. London: Seeley, Service and Co., Ltd., 1922. *Price* 21*s. net.*

Mr. Brewster's book is written after forty years spent in Fiji, and traces the history and evolution of the Fijians from the days of cannibalism to the comparative civilisation of the present time. Judging by a collection of genealogies which he made of the chief families in the island, Mr. Brewster infers that history began in Fiji somewhere about the end of the sixteenth century. There is an interesting chapter on "Ancient Traditions," and another on "Bygone Religious Ceremonies." Wesleyanism was the first form of Christianity to penetrate the island, and it is still the principal one. It was introduced by missionaries about 1835, and many converts were made, though from time to time the natives "threw off the cloth," as it was called, and killed and ate their neighbours. After the first outbreak of measles among the islanders, there was a great return to cannibalism, as the ancient gods were supposed to be calling angrily for human sacrifice.

The three chief treasures in Fiji are, first, Tambua, or the teeth of the sperm whale, used as a sort of charm, or given as a present on great occasions; second, Yangoma, the national drink, apparently more soporific than intoxicating; third, Pigs. The author remarks that the most affectionate compliment ever made him was when after a long absence a Headman said: "We were like unto a litter of little pigs bereft of the old sow, their mother."

Though women are merely chattels, they are very lively and great flirts, and therefore a power to reckon with. Polygamy has died out, and there are strict rules barring marriage between persons of a certain degree of relationship.

The author describes in a very attractive fashion many of his own experiences and adventures, as a British official, in the island where "East and West do meet —in more ways than one."

Essays on the Depopulation of Melanesia. Edited by W. H. R. Rivers. With a Preface by Sir Edward im Thurn. Cambridge: At the University Press, 1922. *Price* 6*s.*

This little book deals with a subject which is at once of great human and scientific interest. It consists of a series of essays by missionaries, administrators, and others having direct personal experience of conditions in the New Hebrides, the Santa Cruz and Solomon Islands, with a final essay by the editor, the late Dr. W. H. R. Rivers. About the actual facts there seems no question. In all the islands named, though to a varying extent, the population is decreasing, apparently alike as a result of an increased death-rate and a diminished birth-rate. Nor as to the immediate causes of the rising death-rate does there appear to be much doubt. The various authors differ slightly as to the relative importance of the several causes specified, and these, further, are not equally potent in all the islands concerned; but they are all agreed that introduced diseases, especially dysentery and affections of the respiratory organs, the adoption of European dress, and generally the effects, direct and indirect, of contact with Europeans are of great importance. Several of them lay much stress upon European dress as a potent factor in inducing disease. This is largely due to the fact that while the Melanesians are fairly clean so far as their persons are concerned, they do not wash or change their clothes, merely adding new garments on

the top of the old as these wear out. In the moist climate of the islands clothing seems to be a real danger, as compared with the well-oiled skin of the heathen days.

The falling birth-rate is stated to be due not only to the high infant mortality, but to the delayed marriages resulting from the recruiting of the young men for work on plantations, to disease, and to the increased use of preventive measures.

Various detailed suggestions are made by the writers as to how the process of depopulation may be checked. Most of these assume that the immediate causes are the fundamental ones. Dr. Rivers, in his most suggestive essay, rejects this view and regards the real reason as the destruction, owing to European influence, of all that made life interesting and attractive to the natives in the old days. He shows, in an exceedingly striking way, that the old custom of head-hunting, which seemed to missionary and administrator alike a mere barbarity, was so intertwined with the whole social life, that its suppression had effects on almost all the arts and crafts of the people, and took from them much of their zest in life. He makes the interesting suggestion that it might have been possible for a sympathetic official with some knowledge of comparative religion to have induced the Melanesians to accept the substitution of the head of a pig for that of a human being in the elaborate ceremonial in which the latter was used, and thus to bring about that substitution of animal for human sacrifice which has occurred in so many religions. While recognising that it is probably now too late for the attempt to be made, he lays great stress upon the necessity for the missionaries studying, in a sympathetic spirit, the native religion and the way in which it was bound up with the whole economic life of the people. He points out, similarly, the necessity for co-operation between the civil power and the missionaries, for the separation between religion and administration is wholly alien to the Melanesian's mode of thought.

GENERAL.

The Statesman's Year-Book, 1922. Edited by Sir John Scott Keltie, LL.D., and M. Epstein, M.A., Ph.D. London: Macmillan and Co., Ltd., 1922. *Price* 20*s. net.*

This year's volume of the handbook of world facts and figures fully maintains the standard of its predecessors. New census returns are incorporated, and trade figures for some European states, although given with values that have at present little meaning, serve to show that more stable conditions are being gradually secured. Changes in post-war policies are carefully noted, and the appearance of an Irish Free State section, and the transference to Part III. of Egypt, in accordance with its new status, are foreshadowed. Of European countries only Russia is still retained in a disordered mass, but that is inevitable. Maps to show the Upper Silesian and Burgenland settlements are included. Altogether the volume is indispensable to those who would keep abreast of world changes and movements, and the editors are to be congratulated on the production of such an accurate, orderly, and complete issue.

Les Grands Marchés des Matières Premières. Par Fernand Maurette. Paris: Armand Colin, 1922. *Prix* 5 *frs.*

This small book, which has a number of clear and simple sketch-maps, deals with the world-market of the following commodities - coal, wheat, wool, cotton, silk, rubber, iron, and petroleum. The selection of these among all the raw materials of commerce has been made, the author states, not only because of their

great importance, but because of the way in which they illustrate the main problems connected with the marketing of produce. The interest of the book for readers here lies especially in the fact that the point of view differs notably from that represented in English books. Great stress is laid upon the changes which have occurred since 1913; in some cases, indeed, it appears to us that the author is disposed to assume too hastily that the conditions which presented themselves in the period immediately after the war will be permanent. His final conclusion is that while there is no evidence that Britain is in a state of economic decay, yet the period of British commercial hegemony is definitely over.

We note a curious error, due doubtless to the use of small-scale maps, in the map showing the coal-exporting ports of Britain. Here the small *inland* town of Morpeth, which is purely an agricultural centre, is marked as one of the four coal-ports of the Northumberland and Durham field; Blyth is doubtless meant. On the same map Leith is marked as the only Scottish port with an export of coal, and this although the position of the Fife coal-field is given correctly.

The Cruise of the "Dream Ship." By Ralph Stock. London: William Heinemann, 1922. *Price* 15*s.*

This is a most entertaining book. The story of the "Cruise" is amusingly told, and the descriptions of people and places are vivid and interesting.

The *Dream Ship* was a Norwegian-built cutter of twenty-three tons register. The crew consisted of the author, his sister, and a friend called Steve, though from time to time they picked up passengers, or assistants. According to the author, they had only a very elementary nautical knowledge amongst them. However, they set out to seek the South Sea Islands. They called at Vigo, and seven days later found Madeira exactly where they expected. Grand Canary did not behave quite so well, and they nearly ran on an uninhabited Salvage island. It took them thirty days to traverse the three thousand miles of Atlantic to Barbados. They passed through the Panama Canal, being towed part of the way at great expense. Finally they reached the Galapagos islands, where they were nearly wrecked on a wall of rock. The islands are volcanic, and the jagged peaks rise sheer out of the sea to a height varying from one hundred to two thousand feet. Seals, sharks, dolphins, turtles, and devil fish could be seen in the water, while the deck was covered with small red and yellow birds. After many adventures the party landed on Christobal. Here they were very much surprised when a wrinkled old man addressed them in slow, but cultured English. He had run away to sea at seventeen, and somehow drifted out to these islands, where he had remained for fifty years, during which time he had only once spoken English before. The soil on Christobal is very fertile, and cattle thrive, though there are only a few hundred acres of cultivation. The people are lazy and little is done for the development of the island. The lagoon swarms with duck.

From here the *Dream Ship* sailed for twenty-two days before a south-east trade till it reached Nukuhiva, one of the Marquesas islands, bounded by "sheer walls of cloud-capped rock, six thousand feet high." In the Paumotu islands they found a network of coral reefs and currents, and the inhabitants were "a race of mermen." "A hint of hurricane" caught them on their way to Palmerston. They went by way of Niue to Tonga Tabu in the Friendly Islands, and here the "Cruise" ended, for the author was tempted, and he sold the *Dream Ship* for a large price.

The party broke up, promising to reassemble when another *Dream Ship* should be found. The author went to Australia, and then up to Thursday Island in quest of a ship, but he found nothing suitable among the pearling luggers.

He visited the shores of the Gulf of Carpentaria, where sandalwood grows in great abundance. His description of life on Thursday Island is interesting.

On the last page of his book the author announces that a new *Dream Ship* has been found in an English Bristol Channel pilot cutter. The crew have been notified, so the reader may one day hope for a sequel to this book of delightful wanderings.

EDUCATIONAL.

The Provinces of Ireland: Connaught. Edited by GEORGE FLETCHER. *Price* 6*s.* 6*d.*
Leinster: East and West. Price 7*s.* 6*d.* Cambridge: University Press, 1922.

These are two further volumes of a series of which the first was reviewed in vol. xxxviii. p. 202. They are written on the same general plan, being due to the combined efforts of several workers. As a subject of special interest we may note the beautifully illustrated account of the "Lusitanian flora" of Connaught by Mr. Lloyd Praeger, who points out the curious combination in this province of southern forms like Mediterranean Heath and Arctic-Alpine types like *Dryas octopetala*. The latter is of course not uncommon in the Scottish Highlands, and is abundant in the Alps. This section will prove of great value to any one with some acquaintance with geographical botany. But if, as the preface suggests, the books are to be used in secondary schools, one cannot but wonder if some notes on the individual plants would not have rendered it of more value both to teachers and scholars. Even the plate of the *Dryas* is likely to puzzle the uninitiated, for the most conspicuous flower does not show the characteristic eight petals but a much larger number, and the peculiar flattened creeping stems are not shown. The index, it may be noted, ignores individual plants, even in the case of such outstanding forms as the characteristic Irish heaths.

The World About Us: A Study in Geographical Environment. By O. J. R. HOWARTH, M.A., Secretary of the British Association. London, Oxford University Press (Humphrey Milford), 1922. *Price* 6*s.* 6*d.*

The thesis of this little book is that the study of geographical environments, though not the whole of geography, and not even its first object, is of great use in aiding the student to acquire the definitely geographical outlook. It may thus be said to be yet another indication of the general trend of geographical thought in this country at the present moment—which is definitely towards the human side. The contents of the book seem to us to illustrate the advantages of the method suggested—the advantages which have made so many sympathetic to it, and also those risks which have driven others back into a more rigid formalism. For example, on p. 10, we find the statement that "the Eskimo of the Arctic, the pygmy of the equatorial forest, is each, in habit of life, the product exclusively of his geographical environment." Now the Eskimo has been the object of much careful research, although the results of this are scarcely represented in geographical text books; we know that he has a peculiarly limited distribution within the Arctic area, and that there is much reason to believe that his culture, so far from being wholly a direct response to his local environment, is in part at least a derived culture, showing secondary adaptations. When Mr. Howarth describes him simply as "of the Arctic," is he not helping to propagate fallacies as to his distribution which are already too widespread? When also, on the same page, he says that Eskimo building material is restricted to snow-blocks, is he not helping to confirm the popular belief that the Eskimo always lives in a snow-house?

On the other hand, later in the book, we find what seem to us most admirable

and detailed examples of methods of studying the question of the causes influencing the sites of towns and villages, examples which are models of this kind of work. The book thus marks a stage in that very necessary process, the more or less precise formulation of a mode of studying human geography which will ensure that its great advantages are preserved, while the more obvious dangers are avoided.

The Expansion of Britain from the Age of Discoveries: A Geographical History. By W. R. Kermack, M.C. London: Humphrey Milford, 1922. *Price* 2*s.* 6*d. net.*

This is an excellent little book which we recommend cordially to the notice not only of teachers but to all who are interested in the effect of geographical conditions on the course of history. The only criticisms which we have to offer are those based necessarily upon its small size, which limits the possibility of full treatment in any particular case. Thus India seems to be treated in rather a sketchy manner, as compared with North America, which is the subject of a very interesting chapter. Again, since the author discusses briefly the historical geography of North America before the work of English explorers began, one feels that a few words at least might have been added as to the expansion of the United States after the War of Independence, for the influence of geography in this case was very striking. But we must hope that the present book will be followed by another planned on a larger scale.

Nouvelle Géographie Universelle. Par Ernest Granger. Paris: Librairie Hachette, 1922. *Prix* 100 *frs.* (*brochés*) *et* 150 *frs.* (*reliés*).

This new comprehensive geography of the world is being issued in ten parts of which we have received Parts 1 to 8. The book begins with Europe and deals with post-war conditions. It is admirably adapted for the general reader, who will find the matter interesting and the style pleasant. The treatment is descriptive rather than scientific. Climate is stated rather than explained; the Gulf Stream is given as the cause of the equable climate of Western Europe; and the opening sentence dealing with the British Isles states that the climate depends on latitude, insularity, and relief, thus ignoring the results of our proximity to the Continent. The countries are treated on a uniform scheme so as to allow the newspaper reader or business man to find what he seeks with the least trouble. The national characteristics of each people are summarised, but the conventional account of the Scot has done service long enough, "malgré sa sobriété (au moins relative) et une économie poussée jusqu'à l'avarice."

The book is well printed and fully illustrated. Particular mention may be made of the photographs, which, if not all valuable for geographical purposes, are beautifully reproduced, and of the small maps in the text, which are clear. The colouring of the orographical plates is a little crude, but the maps are not overcrowded with unnecessary names. In the map (Plate 3) showing British railways the Forth and Tay Bridges are omitted, and in the political map of Europe, Turkey is ignored. There appears to be a place for a volume in English along similar lines.

La Terre et l'Évolution Humaine: Introduction Géographique à l'Histoire. Par Lucien Febvre, avec le Concours de Lionel Bataillon. Paris: La Renaissance du Livre, 1922. *Prix* 15 *frs.*

This bulky volume, with its copious references and its index—the latter still a relatively infrequent adjunct to French scientific books—raises pleasant anticipa-

tion in the mind of the geographer. It constitutes one of a long series of volumes, at present being published under the general editorship of M. Henri Berr, having as a general title "L'Evolution de l'Humanité," and its sub-title suggests to the prospective reader that it deals with the setting of the stage on which the great drama of human life is played. It may be said at once, however, that its perusal gives rise to some sense of disappointment, partly perhaps because the contents do not correspond to the legitimate expectations of the reader. In his conclusion the author states that his book is not a manual nor a general survey, but simply a critical discussion. If the statement had been made at the beginning we feel that M. Febvre would have put himself on better terms with his readers. As it is, one reads chapter after chapter under the impression that the author is but clearing the ground, by a criticism of the views of others, for a full statement of his own standpoint, and instead of reaching this comes finally to a vigorous defence of his purely critical attitude, and to nothing more. The basis of this defence is that human geographers, from Ratzel onwards, have indulged in premature generalisation, have become involved in numerous inconsistencies and contradictions, and have failed to realise the extent to which civilised man can mould his environment, while over-emphasising its effects on his activities. But even if this is so the reader naturally asks whether a criticism of the writing of anthropogeographers can legitimately be described as a Geographical Introduction to History. It is perhaps unnecessary to add that M. Febvre is a historian and not a geographer, and that, though he disclaims any intention of stirring up strife between the students of the two subjects, he makes no attempt to conceal his belief that the historian has the more important rôle to play.

There is, however, much in the book which the geographers will do well to ponder over, and accepted simply as an attack on much recent work in human geography, and not as a presentation of the results of that work, it should find a place in every geographical library.

Die Nord- und Ostseehafen im deutschen Aussenhandel. By Professor Alfred Rühl. Berlin: E. S. Mittler und Sohn. (*Veröffentlichungen des Instituts für Meereskunde an der Universität, Berlin*, August 1920.)

This most instructive study should be consulted by all interested in economic geography. Its content is more fully described on the title-page by the sub-title meaning Investigations on the hinderlands of the ports concerned in the import and export trade of Germany; but it should be added that the entire hinderlands, at least of German ports, are taken into account even where these extend beyond the bounds of pre-war Germany, to which, it should be stated, all the data refer. The data made use of are such as would throw light on the distribution of imports of each port in different portions of the former German Empire, as well as, in some cases, Bohemia and Poland, and the part which the same divisions contribute to exports of these ports. One section deals with the sources of information, indicating how far they are adequate for the author's purpose. In this respect his material varies in value, and it may be mentioned that he found the statistical data of the port of Trieste fuller and more instructive than those of any other European port. The results of investigation are given in tables and maps dealing not with the imports and exports of each port in the mass but with individual commodities or small groups of commodities. The maps are fifteen in number, each showing by linear signs, differing for different ports, the quantity of the commodity received in each division from or the quantity sent from each division to the several ports. Besides seaports, indications are given for the river ports of Duisburg and Mannheim, but, as arrows pointing from these ports for imports and to

them for exports are added, the same linear sign serves for both. In order that these maps may be consulted by those who do not read German the subjects of the maps are given here in order, it being noted that the first nine deal with imports, the remaining six with exports : (1) Coffee, cacao, and tea ; (2) Rice ; (3) Tobacco ; (4) Petroleum ; (5) Raw cotton ; (6) Wool ; (7) Jute ; (8) Wheat ; (9) Iron ores ; (10) Sugar ; (11) Glass and glass wares ; (12) Paper and paper wares ; (13) Yarns and twists ; (14) Iron and steel wire ; (15) Rails. On each map one millimetre of the linear scale stands for a certain number of metric tons, but the quantity so represented varies with the commodity. For coffee, etc., rice, tobacco, wool, jute, and glass one millimetre indicates 100 metric tons, for yarns and twists 50 tons, for petroleum, paper, wire, and rails 500 tons, for wheat and for sugar 1000 tons, and for iron ores 5000 tons. With these explanations the maps may be left to speak for themselves, but readers of German will find in addition many illuminating remarks in the text. G. G. C.

BOOKS RECEIVED.

EUROPE.

The Shores of Fife. Described by JOHN GEDDIE, painted by E. W. HASLEHURST, R.B.A. 8vo. Pp. 68. London : Blackie and Son, Ltd., 1922. *Price* 3*s.*

Hadrian's Wall. By JESSIE MOTHERSOLE. With 14 Illustrations and Map. 8vo. Pp. xix + 241. London : John Lane, 1922. *Price* 8*s.* 6*d.*

Handbook to Hull and the East Riding of Yorkshire. Prepared for the Members of the British Association. Edited by T. SHEPPARD, M.Sc., F.G.S. London and Hull : A. Brown and Sons, Ltd., 1922.

Copenhagen : The Capital of Denmark and its Environs. Handbook for Tourists published by the Danish Tourist Society. By XENIUS ROSTOCK. 8vo. Pp. 89. Copenhagen : G. E. C. Gad, 1922.

L'Allemagne : Lendemains de Guerre et de Révolution. Par MAURICE BAUMONT et MARCEL BERTHELOT. 8vo. Pp. 292. Paris : Librairie Armand Colin, 1922. *Prix* 7 *fr.*

Things seen on the Italian Lakes. By LAURA M. RAGG. Illustrated. Crown 8vo. Pp. v + 150. London : Seeley, Service and Co., Ltd., 1923. *Price* 8*s.* 6*d.*

Swiss Travel Almanac. Edited by the Swiss Tourist Information Office. Pp. viii + 111. Winter Season 1922-23. Switzerland : Otto Walter, Ltd., 1922.

Nights and Days on the Gypsy Trail. Through Andalusia and on Other Mediterranean Shores. With an Account of the Romany Race and an Introduction by GEORGE E. WOODBERRY. By IRVING BROWN. 8vo. Pp. xvi + 267. London : Harper and Brothers, 1922. *Price* 12*s.* 6*d.*

Russia : To-Day and To-Morrow. By PAUL N. MILIUKOV. 8vo. Pp. 392 London : Macmillan and Co., Ltd., 1922. *Price* 9*s.*

ASIA.

Travels of a Consular Officer in Eastern Tibet, together with a History of the Relations between China, Tibet, and India. By ERIC TEICHMAN, C.I.E., B.A. With original Maps of Eastern Tibet and Photographs taken by the Author. Royal 8vo. Pp. xxiv + 248. Cambridge : University Press, 1922. *Price* 25*s. net.*

Beyond Shanghai. By HAROLD SPEAKMAN. With 8 Illustrations in Colour from Paintings by the Author. 8vo. Pp. 198. New York : The Abingdon Press, 1922. *Price* 16*s.*

The Handbook of Palestine. Edited by HARRY CHARLES LUKE, B.Litt., M.A., and EDWARD KEITH-ROACH. 8vo. Pp. xii + 295. London: Macmillan and Co., Ltd., 1922. *Price* 12*s.*

AFRICA.

Brotherhood: Eight Years among the Barotse. By D. W. STIRKE. With an Introductory Chapter by Sir HARRY JOHNSTON, G.C.M.G., K.C.B. Demy 8vo. Pp. 12 + 136. With 45 Illustrations and Map. London: John Bale, Sons, and Danielsson, Ltd., 1922. *Price* 21*s. net.*

Handbook and Directory for Kenya Colony and Protectorate, Uganda Protectorate, Tanganyika Territory, etc. Compiled by "The East African Standard, Ltd." Pp. 617. Nairobi and Mombasa, 1922.

AMERICA.

Labrador: The Country and the People. By WILFRED T. GRENFELL, C.M.G., M.R.C.S., M.D. (Oxon.), and Others. New Edition. 8vo. Pp. viii + 529. New York: The Macmillan Co., Ltd., 1922. *Price* $ 2.50.

Scotland's Mark on America. By GEORGE F. BLACK, Ph.D., with a Foreword by JOHN FOORD. Pp. 126. New York: 1921.

The Real South America. By CHARLES DOMVILLE-FIFE. Illustrated. Crown 8vo. Pp. xvi + 299. London: George Routledge and Sons, Ltd., 1922. *Price* 12*s.* 6*d.*

The Golden River. Sport and Travel in Paraguay. By J. W. HILLS and IANTHE DUNBAR. 8vo. Pp. 187. With 60 Illustrations. London: Philip Allan and Co., 1922. *Price* 10*s.* 6*d.*

Where the Twain Meet. By MARY GAUNT. 8vo. Pp. x + 335. London: John Murray, 1922. *Price* 15*s.*

ARCTIC AND ANTARCTIC.

A Summer in Greenland. By A. C. SEWARD. Cr. 8vo. Pp. xi + 100. Cambridge: University Press, 1922. *Price* 7*s.*

Expédition Isachsen au Spitsberg, 1909-1910. Résultats scientifiques. Tome I. Pp. 125; Tome II. Pp. 154. Christiania: A. W. Brogger, 1916.

South: The Story of Shackleton's 1914-1917 Expedition. By Sir ERNEST SHACKLETON, C.V.O. Illustrated. New Edition. Cr. 8vo. Pp. xiii + 205. London: William Heinemann, 1922. *Price* 5*s.*

The Worst Journey in the World: Antarctic, 1910-1913. By APSLEY CHERRY-GARRARD. 8vo. Vol. I. Pp. lxiv + 300; Vol. II. Pp. viii + 284. With Panoramas, Maps, etc. London: Constable and Co., Ltd., 1922. *Price* 63*s. net.*

Australasian Antarctic Expedition, 1911-1914. Under the leadership of Sir DOUGLAS MAWSON, D.Sc. Scientific Reports. Series A. Vol. III. Part 1. Series C. Vol. III. Parts 1 and 2; Vol. IV. Parts 1, 2 and 3; Vol. V. Parts 1 to 8; Vol. VI. Parts 1 to 5; Vol. VII. Parts 1 to 4; Vol. VIII. Parts 1 and 2. Sydney: 1916-1922.

GENERAL.

The Adventures of Lucky: A Two-seater in Search of the Sun. By JOHN PRIOLEAU. Royal 8vo. Pp. 358. With Maps and Illustrations. London: Jarrolds, Ltd., 1922. *Price* £1, 1*s. net.*

The Wayfarer: Leaves from a Wanderer's Log. By JAMES EDWARD WARD. Cr. 8vo. Pp. 231. London: Macmillan and Co., Ltd., 1922. *Price* 8*s.* 6*d.*

The Cruise of the "Dream Ship." By RALPH STOCK. Illustrations from Photographs. Demy 8vo. Pp. xi + 292. London: William Heinemann, 1922. *Price* 15*s.*

Islands and their Mysteries. By A. Hyatt Verrill. With a Preface by Professor J. Arthur Thomson, M.A., LL.D. 8 Illustrations. Crown 8vo. Pp. xv + 232. London: Andrew Melrose, Ltd., 1922. *Price* 6*s. net.*

Stories from the Early World. By Rachel M. Fleming. With an Appendix by H. J. Fleure, D.Sc. Demy 8vo. Pp. 156. London: Benn Brothers, Ltd., 1922. *Price* 15*s.*

EDUCATIONAL

The Evolution of Climate. By C. E. P. Brooks, M.Sc. With a Preface by G. C. Simpson, D.Sc., F.R.S. 8vo. Pp. 173. London: Benn Brothers, Ltd., 1922. *Price* 8*s.* 6*d.*

English Coastal Evolution. By Miss E. M. Ward, M.A., B.Sc. 8vo. Pp. x + 262. London: Methuen and Co., Ltd., 1922. *Price* 8*s.* 6*d.*

The Wirral Peninsula: An Outline Regional Survey. By W. Hewitt, B.Sc. 8vo. Pp. ix + 299. London: Hodder and Stoughton, Ltd., 1922. *Price* 7*s.* 6*d.*

La Vie pastorale dans les Alpes françaises: Étude de Géographie humaine. Par Philippe Arbos. 8vo. Pp. 717. Paris: Librairie Armand Colin, 1922. *Prix* 28 *fr.*

The Peoples of Europe. By H. J. Fleure, D.Sc. 8vo. Pp. 110. London: Oxford University Press (Humphrey Milford), 1922. *Price* 2*s.* 6*d.*

Geologie. Von Dr. Edgar Dacqué. 8vo. Pp. 128. Berlin: Walter de Gruyter and Co., 1922.

The Business Man's Geography: A Compendium of General and Post-War Conditions in respect of Overseas Produce and Overseas Markets. By E. G. R. Taylor, B.Sc., F.R.G.S. Crown 8vo. Pp. xvi + 498. London: George Philip and Son, Ltd., 1923. *Price* 25*s.*

Business Geography. By Ellsworth Hintington and Frank E. Williams. 8vo. Pp. x + 482. New York: John Wiley and Sons, 1922. *Price* 13*s.* 6*d.*

The Wonderbook Geographies: From Mountain to Sea. By E. G. R. Taylor, B.Sc. Vol. I. 8vo. Pp. 146. London: Geographia, Ltd., 1922. *Price* 3*s.*

The "Modern Outlook" Geographies. Book I. *The British Isles.* By W. H. Barker, B.Sc., F.R.G.S. 8vo. Pp. 110. London: Geographia, Ltd., 1922.

A Geography of the British Isles. By A. R. Laws, B.Sc., and P. Lance, M.A. 8vo. Pp. 320. Oxford: at the Clarendon Press, 1922. *Price* 3*s.* 6*d.*

Testo e Atlante Scolastico di Geografia Moderna. Iniziato di Professori G. Roggero, G. Ricchieri, A. Chisleri. Fascicolo I.-III. Bergamo: Istituto Italiano d'Arti Grafiche, 1923.

REPORTS AND PAMPHLETS.

Statistical Abstract for the United Kingdom in each of the last Fifteen Years from 1906 to 1920. 67th Number. London: Stationery Office, 1922. *Price* 10*s.*

British Guiana: Blue Book, 1921. Demerara: 1922.

Colonial Reports (Annual).—St. Vincent (1128); St. Helena (1129); Fiji (1130); Basutoland (1131); Bermuda (1132); Bechuanaland Protectorate (1133); Barbados (1134); Trinidad and Tobago (1135); British Honduras (1136); Ceylon (1137); Swaziland (1138); Straits Settlement (1140). London: S.O., 1922.

The Geology of Portuguese Nyasaland. By Robert R. Walls, M.A., B.Sc. Pp. 15. Reprint from *Geological Magazine*, May 1922.

Marine World Chart of Nicolo de Canerio Januensis, 1502 (circa). A Critical Study with Facsimile. Issued under the joint auspices of the American Geographical Society and the Hispanic Society of America. Pp. 115. New York: 1908.

Maps reproduced on Glass Transparencies. Selected to represent the Development of Map-making from the first to the seventeenth century. Pp. 44.

A Description of Early Maps (1482-1611). Pp. 20.

Martin Waldseemüller and the Early Lusitano-Germanic Cartography of the New World. By Edward Luther Stevenson, Ph.D. Pp. 22. *Presented by the Author.*

Publishers forwarding books for review will greatly oblige by marking the **price** *in clear figures, especially in the case of foreign books.*

NEW MAPS AND ATLASES.

EUROPE.

ORDNANCE SURVEY OF SCOTLAND.—Publications issued from 1st July to 30th September 1922:—

Six-Inch and Larger Scale Maps.—Six-Inch Maps (revised). Full sheets with contours in red. Price 5s. each. *Linlithgowshire.*—Sheets **4** (filled with Fifeshire, parts of Sheet 43); **5** (filled with Edinburgh, parts of Sheets 1B, 1, 2 and 3, Fifeshire, parts of Sheets 43); **7**. *Stirlingshire.*—Sheet **36**.

1:2500 Scale Maps (revised). With houses stippled and with areas. Price 6s. 8d. each. *Argyllshire.*—Sheets **212.**—3, 4, 13. **213.**—7, 9, 11. **223.**—4, 8. **235.**—10, 14. **236.**—11, 14, 15. **251.**—5, 6.

GEOLOGICAL SURVEY OF SCOTLAND.—Publications issued from 1st July to 30th September 1922:—

General Memoirs.—The Ayrshire Bauxitic Clay, by G. V. Wilson, B.Sc. Price 1s. 6d. net.

Six-Inch Maps. With Geological Lines; uncoloured. Price 2s. 3d. each. *Renfrewshire.*—11 N.E.

ADMIRALTY CHART.

Scotland, East Coast. Aberdeen Harbour. November 1922. No. 1446. Price 2s. *Admiralty, London.*

BARTHOLOMEW'S HALF-INCH TO MILE MAP OF SCOTLAND.

Sheet 24. Gairloch and Loch Inver. New edition. Price 1s. 6d. net; or mounted on cloth 3s. net.

John Bartholomew and Son, Ltd., Edinburgh.

BARTHOLOMEW'S HALF-INCH TO MILE MAP OF ENGLAND AND WALES.

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John Bartholomew and Son, Ltd., Edinburgh.

ASIA.

INDIA.—Showing railways open and under construction. March 1921. Price 1 rupee 8 annas. *Survey of India Offices, Calcutta.*

INDIA AND ADJACENT COUNTRIES.—Scale 1 : 1,000,000. Price 1 rupee 8 annas each. Sheets 80, 89, 90 and 99, one layered and one political of each. Sheet 84 layered only. *Survey of India Offices, Calcutta.*

INTERNATIONAL.—Scale 1 : 1,000,000. Price 1 rupee each.

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„ N.F.-44, **Wainganga.**
„ N.F.-45, **Calcutta.**
„ N.G.-45, **Bengal.**

Survey of India Offices, Calcutta.

QUARTER-INCH SURVEY MAP OF INDIA.—Sheets 56-A, 56-E, 66-D, 83-D, 93-A, 93-E, 93-J, 93-P, and 94-B. *Survey of India Offices, Calcutta.*

HALF-INCH SURVEY MAP OF INDIA.—Sheets 38-P/NW., 39-I/SW., 43-B/NW., 43-B/NE., 43-H/NE., 43-J/NW., 43-K/NW., 43-K/NE., 43-K/SW., 43-K/SE., 43-L/NW., 43-L/NE., 43-L/SE., 43-L/SW., 43-N/NW., 43-N/SW., 44-A/NW., 44-A/NE., 44-A/SW., 44-A/SE., 44-E/NW., 44-E/NE., 44-I/NE., 44-N/NE., 44-N/SW., 44-N/SE., 53-C/SW., 53-C/SE., 53-D/SW., 53-D/SE., 54-A/NW., 54-A/SW., 55-C/SE., 55-G/NW., 55-G/SW., 55-H/NE., 55-H/SE., 55-L/NW., 55-L/SW., 55-L/SE., 56-C/SW., 56-D/NW., 56-G/NW., 57-N/SE., 57-O/NE., 57-P/NE., 57-P/SW., 57-P/SE., 58-G/SW., 58-L/SW., 63-A/NW., 63-B/NW., 63-E/SW., 66-A/SW., 66-B/NW., 83-F/NE., 83-F/SE., 92-E/NW., 92-E/NE., 92-E/SW., 93-A/SE., 93-E/NE., 93-E/SW., 93-N/SW., 93-O/NW., 93-O/NE., 93-O/SE., 95-F/SE., 95-K/SW., 102-D/SW. *Survey of India Offices, Calcutta.*

BARTHOLOMEW'S WORLD SURVEY SERIES.

Malaya and Indo-China.—Scale 1 : 4,000,000. Price 1s. 6d. on paper ; 3s. on cloth. *John Bartholomew and Son, Ltd., Edinburgh.*

This is an important addition to Bartholomew's World Survey Series. The relief of the land is well brought out by delicate shades of green, brown, and purple. The map should prove useful to travellers as well as to those interested in the economic development of this area, which has been rather neglected cartographically.

PHILIP'S COMMERCIAL MAP OF CHINA.—Scale 1 : 3,000,000. Edited by Sir Alexander Hosie, M.A., LL.D., F.R.G.S.

George Philip and Son, Ltd., London.

This map is coloured according to Provinces. Red letters indicate the distribution of animal and vegetable products, while minerals and manufactures are shown by blue and red symbols respectively. Railways, navigable rivers, and open ports are marked, besides other features of commercial significance. The general appearance of the map is pleasing ; it is not overloaded with names, and the product names and symbols are clearly indicated. Like all maps, however, which adopt this method of depicting distribution, it fails to give a graphic idea of the subject. One has only to attempt to trace the cultivation of some of the vegetable products to realise how inadequate the method really is. In spite of this, however, the map is a commendable contribution to the study of economic geography. Its value is enhanced by Sir Alexander Hosie's illuminative text.

AFRICA.

EGYPT-NILE VALLEY.—Scale 1 : 250,000.

Sheet **Nag' Hammâdi, 1921.**
„ **Isna, 1921.**
„ **Aswân, 1921.**

Survey of Egypt, Giza.

EGYPT.—Scale 1 : 100,000.

Sheet 20 R, Kom Ombo, 1920.
" 21 R, Aswân, 1920.

Survey of Egypt, Giza.

WALL MAP OF THE GOLD COAST AND ITS DEPENDENCIES.—Scale 1 : 375,000. Published by the authority of Gen. Sir F. G. Guggisberg, K.C.M.G., D.S.O., Governor, under the direction of Lieut.-Col. R. H. Rowe, D.L.O., Surveyor-General, 1922.

Districts, railways and roads, distinguishing those fit for motor traffic, are very clearly shown, as well as towns, post offices, mission stations, etc. The whole forms a very clear wall map of the area. It is printed by Messrs. W. and A. K. Johnston.

GENERAL MAP OF THE GOLD COAST AND ITS DEPENDENCIES. — Scale 1 : 1,000,000. *Gold Coast Survey.*

GOLD COAST.—Scale 1 : 125,000. Price 9s. 6d. per sheet mounted on linen and dissected.

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Gold Coast Survey.

NORTH AMERICA.

BARTHOLOMEW'S GENERAL MAP OF NORTH AMERICA.—Scale 1 : 10,000,000. Price 2s. 6d. on paper; 5s. on cloth.

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An excellent general map of North America.

SOUTHERN SASKATCHEWAN.—Scale 1 : 792,000. Showing Indian reserves.

Department of the Interior, Canada.

PROVINCE OF ALBERTA.—Scale 1 : 792,000.

Department of the Interior, Canada.

UNITED STATES SURVEY.—Topographic Sheets on various scales. The figures after the name of each State indicate the number of sheets received.

Scale 1:125,000.—Idaho, 1.

Scale 1:62,500.—California, 2; Michigan, 1; Oregon, 1; Texas, 1; West Virginia, 3; Alaska, 1.

Scale 1:31,680.—California, 6.

United States Geological Survey, Washington.

AUSTRALASIA.

NORTH ISLAND, NEW ZEALAND.—Scale 10 miles to 1 inch.

SOUTH ISLAND, NEW ZEALAND.—Scale 10 miles to 1 inch.

Showing railways, main roads, land divisions, counties, etc.

Presented by W. T. Neill, Esq., Surveyor-General of New Zealand through J. Edward Touche, Esq., Edinburgh.

NORTH ISLAND, NEW ZEALAND.—Scale 1 : 2,000,000.

SOUTH ISLAND, NEW ZEALAND.—Scale 1 : 2,000,000.

Presented by W. T. Neill, Esq., Surveyor-General of New Zealand, through J. Edward Touche, Esq., Edinburgh.

NEW ZEALAND.—With Mountain Features in Pictorial Relief. Scale 25 miles to 1 inch.

Presented by W. T. Neill, Esq., Surveyor-General of New Zealand, through J. Edward Touche, Esq., Edinburgh.

TASMANIA, S.E.—Tourist Map, showing principal routes, etc. Scale 3 miles to 1 inch. *Department of Surveys, Hobart.*

Presented by J. Edward Touche, Esq., Edinburgh.

GENERAL MAPS AND ATLASES.

DUTCH CHARTS, 1666. An Atlas of 30 Plates by Pieter Goos.

Presented by the Right Hon. J. Parker Smith, Edinburgh.

STANFORD'S GENERAL MAP OF THE WORLD on Mercator's Projection. Price 5s. 6d. net. *Edward Stanford, Ltd., London.*

A new political map showing the principal shipping routes and chief railway lines in red.

THE "DAILY NEWS" KEY ATLAS to a reconstructed world. Prepared by W. and A. K. Johnston, Ltd. Price 5s. 6d. net.

The "Daily News," Ltd., London.

The maps in this atlas are intended to supplement those in any atlas issued before the new frontiers were laid down. Most of the plates deal with the boundary adjustments, but there are also others showing air-routes, races, and economic features. The atlas should prove useful to the newspaper reader.

ATLANTE FILATELICO. *Istituto Italiano d'Arti Grafiche, Bergamo.*

This is a loose-leaf atlas specially designed for stamp collectors. It consists of 30 maps, round each of which reproductions are given in monochrome of the typical stamps of the country, while on the back of the maps the area is described. Interleaved with the maps are blank pages on which the philatelist may affix samples from his own collection. Distinctly novel in conception, the atlas has been artistically produced.

HISTORICAL ATLAS prepared by Prof. William R. Shepherd of Columbia University, New York. Price 17s. 6d. net. *University of London Press.*

This is a German production, edited by an American Professor, and published in London. To those who desire a small, general, historical atlas it is difficult to see how this could be improved upon. A great deal of information has been crowded into the 216 pages of maps, yet on the whole without confusion.

ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

REPORT OF COUNCIL.

THIRTY-EIGHTH SESSION, 1921-1922.

(*1st October* 1921 *to 30th September* 1922.)

The Council have the honour to submit the following Report :—

ORDINARY MEMBERSHIP.

The changes which occurred during the Session in the number of members were as follows :—

Number on 1st October 1921,		1369
New Members added,		253
		1622
Deduct by Death,	41	
„ Resignation,	67	
„ Arrears,	6	
		114
Number of ordinary members remaining on the roll on 30th September 1922,		1508

Of this number, 710 are on the Edinburgh list, 480 on the Glasgow list, 98 and 104 on the Dundee and Aberdeen lists respectively. In addition to those on the lists named, 39 members reside abroad, and 77 reside in England. The number of Life members in the total given above is 181.

Teacher Associate Members.

Number on 1st October 1921,		400
New Members added,		50
		450
Transferred to Full Membership,	178	
Deduct by Resignation,	64	
„ Arrears,	4	
		246
Remaining on Roll 30th September 1922,		204

Fellows and Honorary Members.

There are six Honorary Members, twenty-nine Honorary Fellows, and one hundred and twelve Ordinary Fellows of the Society, and thirty-six Honorary Corresponding Members.

The Diploma of Fellowship was granted during the session to Mr. C. B. Fawcett, B.Litt. (Oxford), M.Sc. (Lond.), Reader in Geography, Leeds University; Mr. C. T. Macgregor, M.A.; John Henry Kenneth, M.A.; John F. Stewart; Robert R. Walls, M.A., B.Sc.; and George B. Mackie, M.A.

Society's Medals.

The Society's Silver Medal was awarded to Charles J. Robertson and Henry Dawson-Baird, first in the merit list in the ordinary class in Geography in Edinburgh and Glasgow Universities respectively.

The Library and Map Department.

During the past session, 247 books, 61 pamphlets, 168 reports, 29 atlases, 433 map-sheets and charts have been added to the Library. The transactions and periodicals regularly received number 147. The number of volumes borrowed by members was 2339, and the Library was, as usual, much consulted by others in search of geographical information.

The Council desire to record their thanks to the Foreign and Colonial Governments for the official publications they have presented to the Library; to the Treasury for the revised Ordnance Survey Maps of Scotland, both in outline and

colour, as each of the revisions now in progress is published; to the Geological Survey of Scotland; to the Geographical Section, General Staff, War Office; to the Intelligence Department, War Office; to the Admiralty; to the British Museum (Natural History); to the Edinburgh University; to the Survey of India; and also to the under-mentioned private donors of books and maps, viz.:—Miss E. G. Kemp; Mr. George Morham; Mr. H. J. Peddie; Mr. D. A. Wray.

Student Associate Members.

At a meeting of the Society held on 16th September 1922, it was unanimously agreed to admit Scottish University Students as Associate Members on the same terms as Teacher Associate Members.

Donations.

The Council, in expression of its sympathy towards the proposed Memorial to the late Dr. Wm. S. Bruce, contributed the sum of £25 towards the fund (see *S.G.M.*, vol. xxxviii. p. 181).

In response to an appeal from the President of the Royal Geographical Society for a contribution to the support of the Permanent Committee on Geographical Names it was agreed to remit the sum of £10 for this year. Captain Ian Bartholomew, M.C., M.A., was nominated as the Society's representative on this Committee.

Meetings of the Society.

The Society's Anniversary Meeting was addressed by Mr. David G. Hogarth, C.M.G., M.A., D.Litt. Thirty-three Ordinary meetings of the Society were held, eight in Edinburgh, nine in Glasgow, eight in Dundee, and eight in Aberdeen. In addition, five afternoon Lectures were delivered in Edinburgh.

These meetings were addressed by Mr. Patrick Y. Alexander; Miss Ella Christie, F.R.S.G.S.; Mr. Seton Gordon, B.A. (Oxon.), F.Z.S., M.B.O.U.; Mr. C. B. Fawcett, B.Litt. (Oxford), M.Sc. (Lond.), F.R.S.G.S.; Mr. Ahmed M. Hassanein, M.B.E., F.R.G.S.; Mr. M. W. Hilton-Simpson, B.Sc., F.R.G.S., F.R.A.I.; Right Hon. Lord Lamington, G.C.M.G., G.C.I.R., D.L.; G. H. L. Mallory; Right Hon. Lord Meston; Dr. Marion I. Newbigin; Mr. H. M. Paton; Miss L. J. Rintoul; Professor J. Arthur Thomson, LL.D.; Robert R. Walls, M.A., B.Sc.

The Scottish Geographical Magazine.

The *Magazine* has been published quarterly during the past session, though it is anticipated that the number of issues will shortly be increased. The quarterly issue brings the editors face to face with certain difficult problems, especially the preservation of a due proportion in the number of pages assigned to articles, reviews, and notes respectively. Since the number of reviews cannot be decreased without injury to the interests of the Library, it follows that the reduction in the total number of pages in the year must be chiefly at the expense of original articles and notes. In spite of this difficulty a number of important articles have appeared during the year, and it has been possible to increase the number of illustrations and sketch-maps almost to the pre-war level.

The Council desire to acknowledge their obligations to the contributors of articles, and to the following, who have rendered valuable assistance to the editors:—Capt. Bartholomew; Mr. J. E. Belasco; Mr. J. H. Birrell; Mr. J. A. Brown; Dr. R. N. Rudmose Brown; Mr. H. M. Cadell; Dr. R. Campbell; Mr.

Geo. G. Chisholm; Dr. W. B. Drummond; Mr. A. P. Gray; Prof. J. W. Gregory; Mr. N. M. Johnson; Mr. W. R. Kermack; Dr. C. G. Knott; Mr. G. Ligertwood; Mr. John Macfarlane; Mr. C. T. Macgregor; Dr. H. R. Mill; Mr. J. D. Monro; Rev. Dr. Morrison; Mr. T. S. Muir; Mr. D. Pryde; Mr. Ralph Richardson; Mr. A. Stevens; Prof. J. A. Thomson; Mrs. Vesey; Mr. H. R. Wallis; and Mr. W. B. Wilson.

Resignation of Mr. R. W. K. Bain.

The Council regret to record the resignation of Mr. R. W. K. Bain, Advocate, Secretary to the Aberdeen Branch of the Society. The Secretary was instructed to write to Mr. Bain, expressing the high appreciation by the Council of the great services which he had rendered to the Society during his long period of office which extended over thirty-four years.

Obituary.

SIR ERNEST SHACKLETON.

At a meeting of Council held on the 28th February 1922, the Secretary was instructed to assure Lady Shackleton of the sincere sympathy of the Council in the loss that she has sustained, and to express to her their high appreciation of the services that her late husband had rendered to geographical exploration and science.

DR. WM. S. BRUCE.

The Council have to express their deep regret at the great loss which the Society sustained through the death of Dr. Wm. S. Bruce. The Council have recorded their appreciation of the services rendered by him to the Society in the Minute which appears in vol. xxxviii. p. 44.

MR. JAMES CORNWALL.

The Council have likewise to express their profound regret at the loss which the Society sustained through the death of Mr. James Cornwall, a Trustee of the Society. The Council have recorded in the Minute printed in vol. xxxviii. p. 184 their appreciation of the services rendered by him to the Society.

The Council also regret to have to record among others, the deaths of the following members:—H.S.H. The Prince of Monaco; Dr. John Harrison, O.B.E., a member of Council; and Dr. Ebenezer Duncan, Glasgow, a member of Council.

National Collection of Old Maps of Scotland.

The Committee in charge of the National Collection of Old Maps of Scotland, having considered the position with regard to the old maps at present in their custody, agreed to recommend to the Council that appropriate locked accommodation should be provided for the collection in the Society's Rooms, and that all maps not yet housed there should be lodged as soon as possible. It was proposed that the Committee should make itself responsible for the proper arrangement and mounting of the maps as far as possible from the special fund it holds for the purpose, also that it should continue its work of adding to and completing the collection as opportunity may occur. The Council adopted the recommendation.

ABSTRACT OF THE ACCOUNTS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY

From 30th September 1921 *to 30th September* 1922.

FUNDS AT 30TH SEPTEMBER 1921 :—					
£400 Dominion of Canada 3½ per cent. Registered Stock, 1930-50 (Deposited with Treasury), cost				£405	1 0
£1777, 7s. 7d.—5% War Stock, 1929-47, cost				1686	7 6
£100—5% Exchequer Bonds, due 1st April 1922,				100	0 0
				£2191	8 6
BALANCES due by Banks :—					
On Account Current,	£45	10 7			
On Deposit Receipt,	22	10 0			
On Do. do. (Glasgow Equipment Fund)	84	17 11			
			152	18 6	
Petty Cash on hand,			3	0 8	
Balance due by Aberdeen Treasurer,			0	11 8	
Due by Treasurer,			17	8 4	
			£2365	7 8	
Less—Subscriptions received in advance,	£32	11 0			
Associates paid in advance,	2	6 6			
			34	17 6	
			£2330	10 2	

Note.—The £100 5% Exchequer Bonds were realised at their par value, on 1st April 1922.

SUBSCRIPTIONS from Ordinary Members,	£1431	18 0			
Less—Paid in Advance,	12	12 0			
	£1419	6 0			
SUBSCRIPTIONS from Associate Members, less paid in advance, £0, 00s. 0d.,	143	9 6			
DIPLOMA and LIFE MEMBERSHIP FEES,	30	10 0			
DIVIDENDS and INTERESTS,	111	6 7			
GOVERNMENT GRANT,	200	0 0			
ENTRANCE FEES from new Members,	49	17 6			
			1954	9 7	
INTEREST ON DEPOSIT RECEIPT (Glasgow Equipment Fund),			2	4 4	
Note.—Receipts for 1921-22,	£1954	9 7			
Expenditure for 1921-22,	1944	19 8½			
	£9	9 10½			
			£4287	4 1	

MAGAZINE—Expenses of Publication, etc. :—					
Printing and other charges,				£616	1 0½
Illustrations,				30	17 4
Maps,				9	16 6
				£656	14 10½
Less—Magazines sold,	£86	6 0½			
Advertising Receipts,	84	18 6			
			171	4 6½	
			£485	10 4	
GENERAL PRINTING and STATIONERY,				38	16 8
BOOKS and other furnishings for Library,				46	10 1½
EXPENSES in connection with Lectures—*Less* Lecture Tickets sold,				340	0 0½
RENT OF COUNCIL ROOM, Taxes, Gas, Repairs, Insurance, etc.,				257	5 7
SALARIES,				599	5 1
MISCELLANEOUS, including General Expenses, and Postages,				162	18 4½
DONATION—Royal Geographical Society, London,				10	0 0
MEDALS,				4	13 6
				£1944	19 8½

FUNDS AT 30TH SEPTEMBER 1922 :—					
£400 Dominion of Canada 3½ per cent. Registered Stock, 1930-50 (Deposited with Treasury), cost				£405	1 0
£1777, 7s. 7d.—5% War Stock, 1929-47, cost				1686	7 6
				£2091	8 6
BALANCES due by Banks :—					
On Account Current,	£242	1 6			
On Deposit Receipt,	45	14 6			
On do. do. (Glasg. Equipment Fund),	87	2 3			
			374	18 3	
Petty Cash on hand,			6	2 9½	
Balance due by Aberdeen Treasurer,			0	2 6	
			£2472	12 0½	
Less—Subscriptions received in advance,	£12	12 0			
Accounts outstanding,	110	2 11			
Due to Treasurer,	7	12 9			
			130	7 8	
			2342	4 1½	
			£4287	4 1	

Edinburgh, 2nd November 1922.—I have examined the Accounts of the Royal Scottish Geographical Society for the year ended 30th September 1922 of which the above is an Abstract, and compared them with the Vouchers and Instructions thereof, and I find the whole to be correctly stated and sufficiently vouched and instructed.

P. C. ROBERTSON, M.A., C.A., Auditor.

LIVINGSTONE MEDAL FUND.

Funds at 30th September 1921:—		
£572, 12s. 5d. 5% War Stock, 1929-47, cost		£543 19 10
Deposit Receipt Commercial Bank of Scotland, Limited,		196 1 5
		£740 1 3
Due to Treasurer,		17 7 1
		£722 13 11
Income Received:—		
Interest on £572, 12s. 5d.—5% War Stock, 1929-47, unlaxed,	£28 12 8	
Bank Interest,	17 2 11	
		45 15 7
		£768 9 6

Funds at 30th September 1922:—	
£572, 12s. 5d.—5% War Stock, 1929-47, cost	£543 19 10
Deposit Receipts Commercial Bank of Scotland Ltd.	[illegible] 4 4
Due by Treasurer,	11 5 4
	£768 9 6

Edinburgh, 2nd November 1922.—Examined and found correct.

P. C. ROBERTSON, M.A., C.A., Auditor.

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THE SCOTTISH

GEOGRAPHICAL

MAGAZINE.

SCOTTISH CANALS AND WATERWAYS.[1]

By H. M. Cadell, B.Sc., F.R.S.E., D.L.

(With Maps.)

Among the many proposals for the rehabilitation of British industry and the prevention of unemployment, that of the improvement and cheapening of transport holds an important place. It is often suggested that the inland waterways should be developed and extended, and more canals constructed for the benefit of rural trade and industry, or the improvement of marine navigation. Many well-meaning people urge the construction of canals without thinking out what these schemes would involve, and without adequate knowledge of the past history of works of this kind, constructed by like-minded enthusiasts long ago. What is required is an accurate, unprejudiced account of the construction and working of such canals as we already possess, of the reasons why they were made, and what they cost, whether they have been successful or not, and if not, why not?

So far as Scottish canals are concerned, we have before us an authoritative and readable treatise, which provides exactly the kind of information that is wanted, and in the way that it is wanted. Although Mr. Edwin A. Pratt's *Scottish Canals and Waterways* is a substantial book of nearly three hundred large octavo pages, with sufficient illustrations, the price is not more than 10s. 6d. It is a book which all who are interested in the canal question should buy and study. This well-digested epitome of the history of Scottish canals shows the various reasons for their failure, and discusses impartially the prospects of canalisation in the future.

[1] *Scottish Canals and Waterways.* By Edwin A. Pratt. London: Selwyn and Blount, 1922. Price 10s. 6d. net.

There are in Scotland four canals, two of them in undeveloped rural districts and two in places where there are riparian inhabitants. The Caledonian Canal is the longest and the Crinan Canal the shortest, and both of these waterways belong to the Government. The Forth and Clyde Canal, with its southern branch, the old Monkland Canal, belonged to the Caledonian Railway Company, and the Union Canal, from Edinburgh to Falkirk, was the property of the North British Railway Company up till the end of 1922, when these became merged into the larger railway groups. It is instructive to study the history of each of these waterways. We can see how various well-intentioned schemes have failed, and of such failures the Caledonian Canal is probably the most conspicuous. We shall begin here and visit the other canals afterwards, and finally consider the recent Forth and Clyde Ship Canal scheme and any other suggestions that are likely to be of permanent value.

The Caledonian Canal.

This waterway, along the Great Glen—the deep rift that runs straight up Loch Linnhe to the Moray Firth—seems by nature admirably adapted for a sea-to-sea canal. A large part of it is already canalised by a line of freshwater lochs not far above sea-level, and an inland waterway, such as nature here suggests, would save ocean navigators a long and perilous voyage between the Atlantic and North Sea by way of grim Cape Wrath and the wild Pentland Firth.

The entire length of the Great Glen, including the arms of the sea at either end, is about 113 miles. The salt water section, made up of Loch Linnhe at the south west and the Moray Firth at the north-east end, is about 52 miles in length. This is supplemented by 38 miles of fresh water in the basins of Loch Lochy, Loch Oich, and Loch Ness respectively. The necks of dry land between them cover 23 miles in all; and the highest part of the Glen is occupied by Loch Oich, whose surface is 106 feet above sea-level.

The proposal to make a canal here was first put forward about 1730, but seventy years elapsed before any serious consideration was given to it. The real impulse to the scheme was mainly political. A sea-to-sea canal was thought likely to be advantageous for strategical as well as for commercial reasons during the Napoleonic wars. At that time there was also great poverty and distress, leading to a constant stream of emigration from the Highlands to America. How to stem the rising tide of emigration and prevent the threatened depopulation of the Highlands became a burning public question. The urgent need for providing employment and the opening up of that remote uncivilised region for trade and industry finally led the Government to have plans and estimates prepared and funds voted for the construction of the canal.

Telford was the engineer, but James Watt had also reported on the

scheme. The Act was passed in 1803, and Telford's estimate of the whole cost was £474,000. Construction began in 1804, but many difficulties were encountered, and the actual expenditure far exceeded the original estimate. At the Loch Linnhe end a flight of eight locks, which he called "Neptune's Staircase," had to be constructed by Telford between Loch Eil and Loch Lochy, which alone cost £50,000. The war that was still raging, like the greater war of our own times, so increased the cost of living that wages had to be raised about 50 per cent., while materials of all sorts became 50 to 100 per cent. dearer. By 1819 the aggregate of the Government grants reached £905,000, and the work was not yet completed. The canal had many opponents, both in Parliament and out of it, who denounced the expenditure fiercely. It was a time of deep commercial depression, and loud demands for public economy. But the canal had also zealous friends, who prevented the Geddes axe of the day from completely ending it. It was opened in 1822 after taking eighteen years—instead of the seven years in Telford's original estimate—for construction. While the whole estimate had been enormously exceeded, the prospects of a revenue had greatly diminished, and even then the work was not satisfactorily completed. By 1827 the total expenditure had risen to over £973,000, and the revenue was insufficient to meet the cost of maintenance. If the canal was to continue to exist, further State subsidies were absolutely necessary ; and by 1830 the question of finally abandoning such a ruinous enterprise was seriously discussed.

From 1830 onwards the efficiency of the canal continually diminished. Accidents occurred in the shape of falls of earth and stones from the adjoining heights, just as similar, but far greater, landslides upset the calculations of the Panama Canal engineers in recent times, and could not be foreseen by anybody. The premature opening of the canal in 1822 in deference to the impatience of Parliament and the public, led to a series of mishaps which culminated in 1838 in the collapse of one of the walls of the lowest lock at Fort Augustus. By that time, although £1,023,000 had been spent, and a further liability of £39,000 incurred, the condition of the works was still most unsatisfactory. Mr. James Walker, President of the Institution of Civil Engineers, was called in to report, and he estimated that it would take a further £200,000 to complete the canal and make it efficient. He said that the traffic passing through it was probably not $2\frac{1}{2}$ per cent. of that *via* the Pentland Firth, and the only possible remedies were to deepen it to at least 17 feet, and to use steam tugs to take sailing ships through against the wind.

This last point is an important one. The canal was originally intended for sailing ships, but it was found impossible to sail both ways through this narrow waterway. Vessels could not beat against a head wind, and preferred rather to risk the dangers of the northern ocean route, where at least there was plenty of room for tacking. Other defects were the faulty construction of the locks and the leaks in the em-

Inshinnoch and the select committee appointed to report in 1839 declared that "the whole works appear to be in a dilapidated and insecure state and their condition is daily becoming more alarming." In these sad circumstances was the canal to be abandoned or not? The abandonment was not, however, such a simple matter as might be supposed. The waters of Loch Lochy, which has a surface of 6000 acres, were impounded and raised several feet above their original base. They were held back by only a single pair of gates from devastating the country and the villages at a lower level, and it was doubtful if the loch could now be restored to its original height. If the canal were abandoned it would still be necessary to maintain banks and locks to prevent the flooding of the neighbouring district, and to ensure the safety of the works almost as large an establishment would be required as if navigation were kept open, and this without any prospect of revenue at all.

These considerations finally led to the committee recommending that a sum not exceeding £200,000, as estimated by Mr. Walker, should be granted by Parliament. At the same time this recommendation was strengthened by many instances that were brought forward of delays incurred by vessels navigating the Pentland Firth and being storm-stayed for long periods at great expense and risk to the shipowners and traders. But there was still hostility in Parliament to throwing more good money after bad, and in 1840 the proposal was carried to lease the canal in the hope that private enterprise might succeed where nationalisation had so lamentably failed.

The negotiations for a lease to a joint stock company for some reason—not difficult to understand—fell through, and in 1842 another expert, Captain Sir William Edward Parry, R.N., the Arctic explorer, was consulted. He reported that if the canal were made efficient it would be very largely taken advantage of both in peace and war; but in regard to its condition he supported the views of Mr. Walker and the select committee in 1839, and added that the cost of abandoning this "Splendid National Undertaking" would be at least one-third of the cost of completing it. Government did not know what to do, and appointed another select committee, who reported that the cost of abandoning it and liquidating the debt would come to £91,000, whereas the cost of the necessary repairs would be £150,000. In 1842 the expenditure had already exceeded £1,000,000, but Parliament finally sanctioned the additional £150,000 asked for to complete the waterway and make it serviceable.

The money was voted, a satisfactory contract was made, and the canal was duly completed and opened on 1st May 1847; but by this time £228,000 had been spent, or £78,000 more than the estimate of the committee of 1842. A fleet of four steam tugs was provided, but in 1860 the Commissioners reported that the cost of maintaining the tugs had generally been double their earnings, although they contributed to a threefold expansion of the tonnage of vessels dealt with. In that year, although no further grants had been made, the financial

position became so serious that an Act was passed authorising the Commissioners to grant a lease of the canal for ninety-nine years to a suitable tenant with or *without any rent at all.* But to this liberal offer there was no response, and the waterway still remains under State control.

In fact, when the Royal Commissioners on Canals and Waterways examined witnesses in 1906-9, they were told that, for purposes of commercial navigation, the canal had become practically obsolete. The locks were too numerous and not large enough for modern ships, etc., and the whole waterway was too shallow. The canal, in fact, required to be reconstructed from end to end to be of any practical use. New plans were proposed, including one for the lowering of the present summit level of Loch Oich to that of Loch Lochy, enlarging the channel, and making new locks, the cost of all the works, which would take three years to complete, being estimated at £2,000,000.

During the War the ordinary goods traffic was greatly curtailed. But the Admiralty made considerable use of the canal, and no doubt if the plan proposed to the Royal Commissioners in 1909 had been completed it would have been still more useful. The greatest service rendered by the canal was in 1919, when 3715 Admiralty craft and 5439 private vessels made use of it, but the former, following the usual practice, paid no rates or dues for this accommodation. The largest ship that has ever passed through the canal was one that carried 800 tons of timber, but she was only taken through with difficulty by a special increase of the depth of the water in the reaches. The canal as it stands can hardly take in a vessel carrying a cargo of 400 tons with safety, and thus it is only available for smaller craft than are now generally used for trading purposes.

The canal, since it was repaired, is not, however, any longer run at a dead loss, for Mr. Pratt informs us (p. 247) that for the eleven years prior to 1913 the revenue exceeded the expenditure by an average of £800 per annum.

It is true, of course, that this small working profit gives practically no return on the capital expenditure, but the whole canal cost, after all, less than a single modern battleship, that never yields any direct monetary return and is destined to be scrapped in a few years. If the capital value be disregarded, the canal is no longer to be considered a public burden requiring an annual subsidy for maintenance, and the question of its reconstruction, to render it still more useful, is worth consideration. One estimate we have already noticed, for the making of a practically new waterway on the level of Loch Lochy at a cost of £2,000,000. Loch Lochy is 106 feet above Ordnance datum and 11 feet below the level of Loch Oich, which is that of the existing canal, and the reduction to this height would save some locks. But a later proposal has recently been made for a still lower waterway on the level of Loch Ness, which is only 51 feet above the sea. This would save nearly all the locks, but would be a far more expensive and altogether a much more ambitious undertaking. The cost was estimated at about £10,000,000, but whether

this would be sufficient there may be some doubt in view of the experience as to the cost of canals in other places.

In the beginning of January 1923 the newspapers published a notice about this scheme, as brought before Sir Murdoch Macdonald, M.P. for Inverness-shire, on behalf of the business community in the north of Scotland. A deep ship canal on this route would possess many of the advantages and few of the drawbacks pertaining to the proposed Forth and Clyde Ship Canal, and would provide much useful employment over a wide district. The relative advantages that are claimed for this route are as follows :—

1. It traverses a fog-free district.
2. It makes use of national property which has never had a fair chance.
3. There is no competition with railways.
4. Fewer bridges are necessary.
5. The approaches were dredged for large vessels during the War by the Admiralty.
6. There are safe deep-water shelters at each end in Loch Linnhe and the Cromarty Firth.
7. There is little danger of collisions, as the waterway is not congested like the Clyde.
8. The capital outlay is much less than that required for the proposed Mid-Scotland canal, and there is more likelihood of earning a free income from it.

The proposal seems worthy of further investigation. A ship canal here, designed to save the long and perilous voyage round the north coast, meets many of the arguments in favour of the Mid-Scotland Canal and would be far less costly and almost as useful for ocean traffic. It is true that a new Caledonian canal on the level of Loch Ness would have a couple of locks at each end, but there would be a long intermediate, clear, and straight reach, and, except in the cuttings, ample room for ships to pass one another. There is also an abundant water-supply to keep the locks full.

Apart, however, from these points, the Great Glen has two important natural advantages. The sides of the valley are eminently suitable for afforestation, and there has been much planting of coniferous wood here in recent years. Immense quantities of colliery and sawn timber are imported from Scandinavia and the Baltic, where the wood can be cheaply brought to the shore. The existing home woods are mostly too far from ships and railways, and the canal would be of national service in cheapening the transport of local timber. The climate and soil conditions are better adapted for tree-growth than those of Scandinavia, and with improved facilities for transport, far more good home timber reared on modern scientific principles could be produced and sold than has hitherto been possible. The second natural resource of the Great Glen is derived from the heavy rainfall on the surrounding heights, and the numerous

waterfalls capable of producing power. As coal becomes scarcer and dearer, the inexhaustible water-power in such places will become ever more important. The well-known Fall of Foyers in Loch Ness has been already utilised by the British Aluminium Co. for power, and at Invermoriston on the west side of the loch there is a river capable of developing 10,000 horse-power. Smaller falls might also be harnessed, and the Great Glen with the help of a good canal might in time become the seat of thriving rural industries. Sawmills and pulp factories might make use of the timber resources after the trees are grown to marketable size, and save the import of much foreign material.

There is here no possibility of railway competition, as the only local line along the Glen has proved a financial failure. A canal such as this, along a valley for the most part occupied by water, serves both sides, while a railway can only minister to the needs of one.

For these reasons, in spite of past disappointments, it seems to me possible that the Caledonian Canal, if reconstructed, might perhaps justify the expenditure, and yet become a waterway of considerable national utility.

The Crinan Canal.

The Crinan Canal traverses the isthmus at the northern end of the Kintyre and Knapdale peninsula which separates Loch Gilp, a branch of Loch Fyne, from Loch Crinan on the sound of Jura. The neck of land from high water to high water is only $4\frac{1}{2}$ miles across, but the distance by sea from Ardrishaig to Crinan round the Mull of Kintyre is over 130 miles. Vessels from the Clyde to the Hebrides or Oban would be saved a voyage of 85 miles by using the canal. The Mull is exposed to the open sea where currents are dangerous, and the weather is often very stormy. For speed and safety to coasting craft, a good short-cut here is therefore much to be desired.

The canal was originally constructed by a company consisting of such public-spirited landlords as the Duke of Argyll and the Earl of Breadalbane, with others interested in the development of the west coast industries and fisheries, and the trade of Glasgow and the Clyde. The authorised capital was £120,000, and the work of construction was begun in 1793. But, like the Caledonian Canal, this waterway proved far more costly than had been anticipated, and it was found impossible to raise further capital by private subscription. In 1797 Parliament sanctioned a loan of £25,000, and this permitted the canal to be opened in 1801. But the lack of funds prevented the work being satisfactorily executed, and sundry repairs were soon found necessary. At this time the wars abroad made money scarce and raised the cost of construction. The experience of the Caledonian Canal was thus repeated on a smaller scale. Further State help was required, and loans were granted from time to time. The total sum expended up till 1816 was £180,000, of which £98,000 had been raised by subscribers, and the rest made up of revenue from the tolls and Government loans.

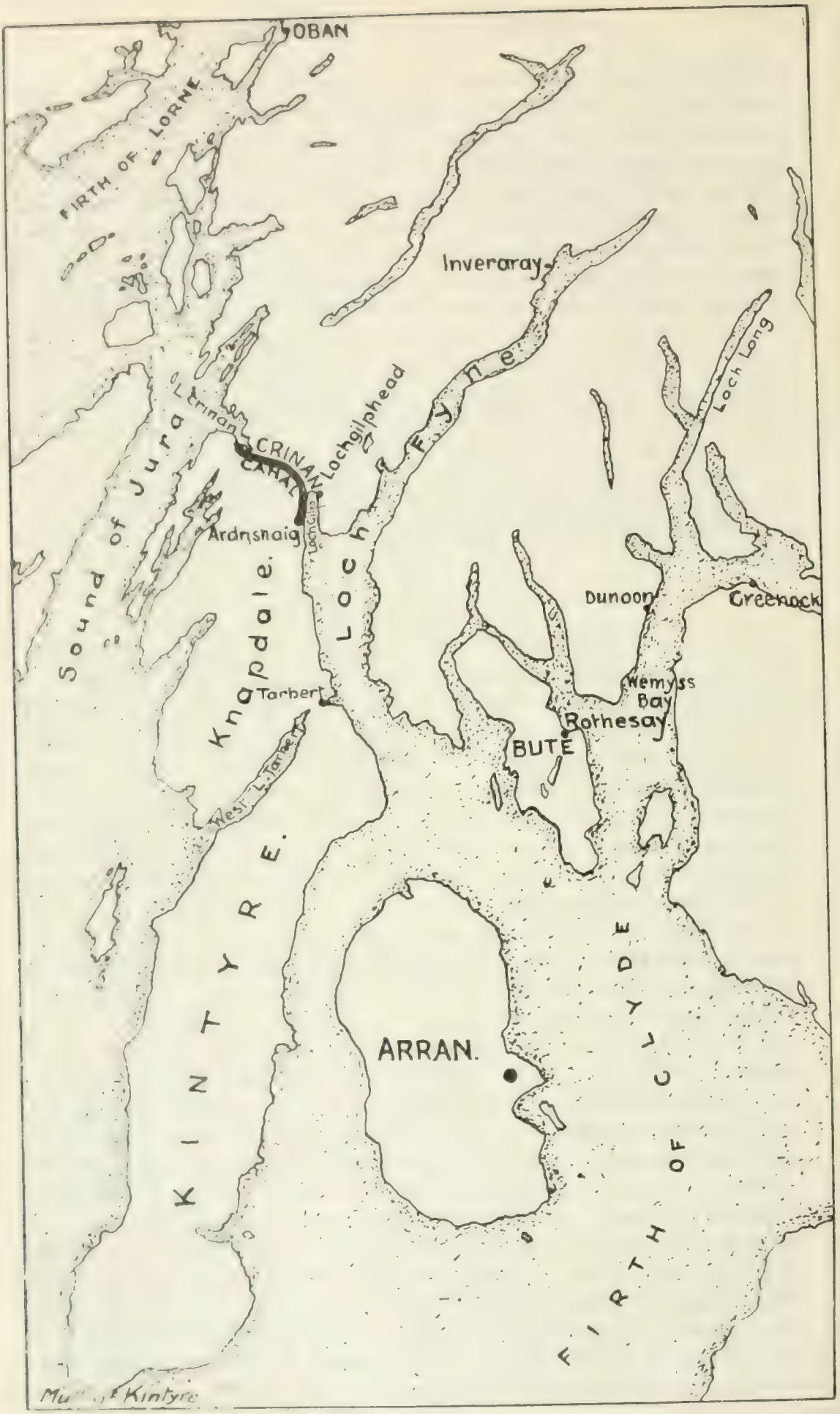

FIG. 1.—The Crinan Canal.
(From Pratt's *Scottish Canals and Waterways*.)

The original company, who had borrowed £74,000, found that they could not carry on, and in 1860 the Crinan Canal was taken over by the Caledonian Canal Commissioners. The latter offered to lease either or both of the canals for a period not exceeding ninety-nine years, with or without any rent, but here also there were no offers. The company having failed to repay the debt, the canal finally became State property in 1868, and the patriotic subscribers lost all they had sunk in it.

The canal has a total length of $8\frac{3}{4}$ miles, and the highest reach in the centre, 1114 yards long, is 64 feet above mean sea-level. There are altogether fifteen locks in this comparatively short distance, and if the central reach were deepened 32 feet for a mile and a quarter of its course, eight of the locks could be dispensed with. But the canal is otherwise defective and contains dangerous bends and rocky corners that have never been removed. In 1878, when navigation was stopped for lack of water, no fewer than 15 tons of broken propellers were cleared out that had been knocked off vessels by these projecting rocks. Since 1885 eleven small steamers that had been sunk by these corners have had to be raised by the engineer. The canal is, in fact, both too small and too badly constructed to be an adequate or safe waterway, and a totally new one is required for steam traffic.

In 1906 Messrs. Crouch and Hogg made a detailed survey for a new freshwater canal with two locks and a summit level of 11 feet, and this was estimated to cost at that time £745,000. But an alternative estimate was also made for a ship canal to cost £796,000. This would permit of the passage of vessels of 1500 tons as against 150 tons, the greatest carrying capacity of vessels using the present canal. There would be a depth of water of 20 feet as against $9\frac{1}{2}$ feet, and no artificial embankments or dangerous corners. An immediate revenue of £20,000 was anticipated, and the cost of working and maintenance given as £6000 per annum.

On taking an impartial view of the whole matter, the construction of a new and larger Crinan Canal seems to me the most feasible of all the recent canal proposals in Scotland. Here there can be no possibility of railway competition, which has killed the existing Forth and Clyde Canal. It is of high importance to the poor inhabitants of the Outer Hebrides and the West Highlands to have a short and safe steamship connection with the Clyde. The summer passenger and tourist traffic is also an important consideration. With a commodious ship canal here, swift steamers from Fairlie or Wemyss Bay on the Clyde could without change make the journey to Oban in $4\frac{1}{2}$ hours and to Fort William in $6\frac{1}{2}$ hours. The long and rough sail round the Mull would be avoided, and the trip would all the way be amid good scenery and within the shelter of the outer islands. It would become a favourite summer cruise both for passenger steamers and yachts. The shortened course would expedite the mails and the transport of livestock and fish to the Glasgow market, as well as the conveyance of timber, slates, and other products of the west coast. The export of coal and other commodities to the islands

would likewise be assisted and freights would be reduced. All these things would help to prevent the local depopulation of the West Highlands, and promote much useful employment.

This seems a practicable proposal to consider, and by and by, if the reconstructed Crinan Canal were found to justify the outlay, it might well form an important link in the chain of a new trade-route by way of the Caledonian Canal to the east coast. Clyde steamers or motor-ships could sail straight on to Inverness and the Moray Firth without having to face the tempestuous waters of either the Mull, Cape Wrath, or the Pentland Firth.

The Forth and Clyde Canal.

Here we have a somewhat different aspect of the canal question before us, the case of a privately owned waterway once both useful and successful that has now outlived its utility. Natural economic conditions, and not original defective construction, are the causes of this decline. Long before railways were thought of, a canal across Scotland by way of the deep straight trench occupied by the Bonny Water on the east and the Kelvin on the west appeared a highly important acquisition. Indeed, the idea of a new trade route here had been promulgated so far back as the time of King Charles II. But more than a century elapsed before any practical steps were taken to carry out the plan.

After 1760, when the establishment of the great Carron Ironworks on the Forth near Falkirk marked the beginning of the Industrial Awakening of Scotland, many new schemes were set afoot. The construction of a canal between the east and the west coast was eagerly discussed. The Glasgow merchants wanted a new trade-route from their city to the east coast and the North Sea. This would benefit Glasgow, but they objected to the idea of a ship canal from the Forth to the Clyde that might also be of use to the east of Scotland, and an acrimonious discussion ensued. The Glasgow proposal was for a small canal only, ending in the city without a connection with the Clyde, and a Bill was presented in Parliament in 1767 to give effect to this plan. But the east of Scotland proprietors and traders united in successfully opposing the Bill, and ultimately their plan for a "great" canal was authorised. When the Act was obtained the authorised capital was £150,000, with power to raise a further £50,000 if necessary.

The work of construction began in July 1768, but many unforeseen difficulties were encountered which added to the cost. The deep Dullatur Bog lay along the line of the canal at the summit near Kilsyth, and the track was cut through the moss instead of along the solid ground on the north side of it. In consequence of this engineering error the embankments required 55 feet of earth and stone to be sunk in the morass before a solid bottom was reached. By 1773 navigation was opened as far west as Kirkintilloch, when the work had cost £212,000. The revenue of £4000 and all the money subscribed had been spent,

but the canal was not nearly completed. Glasgow subscribers, however, raised a sufficient sum to pay for a connection from Stockingfield, where the canal ended, to Hamilton Hill in the outskirts of the city. This branch was completed in 1777, and the basin at the end became known as Port Hamilton. Glasgow had at last obtained a waterway to the Forth, but the prospects were so unpromising that the company's stock had fallen to half its original value, and Scottish investors were not inclined to sink more good money in it.

The east end of the canal entered the Forth at the mouth of the river Carron where the sea was shallow and the navigation bad, but in 1784 a Bill was obtained for the construction of a new outlet to the sea at Bo'ness. This would have been of much advantage to the future economic working of the canal, but the extension was never made, and the new harbour at Grangemouth was developed instead, and largely extended in later years.

But that same year the subscribers saw that there would be no adequate return so long as the canal was not completed with an outlet to the Clyde, and they finally appealed to the Government for financial assistance. A Bill was passed authorising an advance of £50,000 from the Forfeited Estates Fund, and the work was resumed after being suspended for nine years. The junction with the Clyde at Bowling was effected on 28th July 1790, twenty-two years after the canal had been begun. The committee of management celebrated the great event by sailing in their barge, accompanied by the Glasgow magistrates, from Port Hamilton to Bowling, a festive voyage of 11 miles. They took less than four hours to make this happy trip, and passed through the nineteen locks which overcame the fall of 156 feet from the summit level to the shore. When they reached the Clyde they emptied into it a hogshead of water from the Forth as a symbol of the junction of the eastern and the western seas.

Various improvements were afterwards made. A new basin—Port Dundas—was substituted for Port Hamilton, and the depth of the waterway was increased as much as possible. The canal is at present 9½ feet deep, and is navigable for boats 68½ feet long, with 19 feet 8 inches beam. It is 35 miles long, and has altogether 39 locks from the summit, which is 158 feet 6 inches above mean sea-level.

The Monkland Canal, which had been begun in 1770, was constructed to convey coal and ironstone in shallow barges from the Airdrie and Coatbridge district to Glasgow. It proved, like the other, far more costly than had been anticipated, and was in 1790 connected with the Forth and Clyde Canal by a collateral cut 1½ miles in length. The junction of these two undertakings was to the advantage of both, but after the railways were extended the Monkland traffic steadily declined. In 1863 the tonnage on this canal was 1,529,918, and the revenue £37,987, but in 1921 the tonnage had declined to 30,128, and the revenue to £1284, nearly all the traffic having been diverted to the adjoining railways.

After the final completion of the Forth and Clyde Canal it is pleasant to record the success of the undertaking and the prosperity that attended it for many years. The canal was not used for goods only. It became a favourite resort of passengers also, and there were luxurious "Swift" boats drawn by galloping horses, with gay postillions in scarlet coats, and stables every two miles, where the thoroughbred steeds were changed and fed. In 1812 the total number of passengers carried was 44,000, and three years later 85,368. The opening of the Union Canal, by which passengers could sail all the way from Edinburgh to Glasgow, gave a great impetus to the traffic. By 1836 the number had increased to 200,000, and the revenue flourished proportionately. In 1837 a dividend of 30 per cent. was paid, and the value of the £100 share had risen to £650.

But this was the summer time of the canal, and the sun had reached the solstice. The monopoly was broken when the new railways appeared on the horizon and began to absorb the traffic. Steam slowly came into general use, and the first lighter with a screw propeller was used in 1856. By 1866 there were no fewer than seventy steam vessels in use on the canal as well as the old horse-drawn barges. Under normal pre-war conditions about 70 per cent. of the total traffic on the Forth and Clyde Canal was carried on by steam lighters, and the remainder by horse haulage.

After 1840 the company found business developing so fast that a better harbour at the mouth of the canal became necessary, and the first wet dock was opened in 1843 at Grangemouth. To this was added a second dock in 1859, as well as some timber basins, and the harbour so enlarged was in the following year linked by a branch line to the Edinburgh and Glasgow Railway to keep the traffic open when the canal was blocked with ice.

By this time the railways were being quickly extended and amalgamated, and the numerous small lines were becoming absorbed by the larger companies. The Caledonian Railway was then extending its operations, but it had no large port for the shipment of its goods. It was for this reason led to acquire the harbour of the Forth and Clyde Navigation in 1867, and with the harbour went the canal as an essential part of the whole undertaking. At the end of 1922 the Caledonian Railway and all its belongings became part of the London, Midland, and Scottish Railway Company's system. It will thus be seen that the Caledonian Company acquired the canal, not because they wanted it, but because they could not get the harbour without taking it too, and having paid for it, their interest has been to make it as remunerative an asset as possible. The shareholders of the canal were guaranteed a fixed annuity of £71,333, being 6¼ per cent. on the capital of the company, and later this was changed into an equivalent in 4 per cent. stock of the Caledonian Company. The payment of this price shows the success of the old canal up till the time it ceased to be a separate undertaking.

Since then the traffic has steadily declined. In 1868 the tonnage

carried was 3,022,583, and the revenue £87,145, but in 1913 the traffic had fallen to 776,731 tons, and the revenue to £35,136. During the War, which practically suspended the trade of the Forth, there was of course a further serious decline, but in 1921, although the recovery had begun, the tonnage on the canal was only 184,410, and the revenue from it £12,032.

The plain fact remains that the canal is no longer able to compete with the railways, of which there is now one on either side, and even if extended and improved, it would scarcely be used by the traders on its banks. I shall return to this subject in connection with the Ship Canal project, but now the story of the Scottish waterways may be completed by a short account of the one that was a failure from the beginning, and has no prospects of usefulness at all.

The Edinburgh and Glasgow Union Canal.

At the end of the eighteenth century, after the Forth and Clyde Canal had begun to attract attention, the citizens of Edinburgh bethought themselves that a waterway connecting their city with the west of Scotland would be a highly beneficial acquisition. The large coalfields in the west, supposed to be quite inexhaustible, were being opened up, and a canal would bring in a cheap supply of fuel, and generally improve industrial facilities along its banks. Much discussion took place as to the various routes, and after several years had passed, a scheme was finally approved for the construction of a canal from Fountainbridge, on the Lothian Road, "near" Edinburgh, to the Forth and Clyde Canal at Camelon, west of Falkirk.

The distance as the crow flies between these points is about 25 miles, but as the line of the canal for the most part follows the winding contour of the ground, the length of the waterway is actually 31½ miles. The canal is 40 feet wide at the water surface and 5 feet deep, and between Falkirk and Edinburgh it extends in a single reach of 31 miles about 240 feet above sea-level. It is carried in three aqueducts of massive stone arches over the Water of Leith, the Almond, and the Avon valleys respectively. The most expensive part of the work was at the west end. Here the canal could not follow the contour of the ground, but had to be carried in a tunnel 700 yards long through the ridge of solid rock south of Falkirk. The adjacent railway line had also to be tunnelled through the same obstacle. To connect the waterway with the Forth and Clyde Canal at Camelon, which is here 110 feet lower, eleven locks were required in the last half-mile, and these works, together with the high aqueducts and various deep cuttings, contributed largely to the whole expenditure.

The Union Canal was begun in 1818 and was opened for traffic in 1822. As in all the other cases, the original estimate (£235,000) proved totally inadequate. By the time the canal was opened the expenditure had risen to £400,000. But the work was not satisfactorily completed till

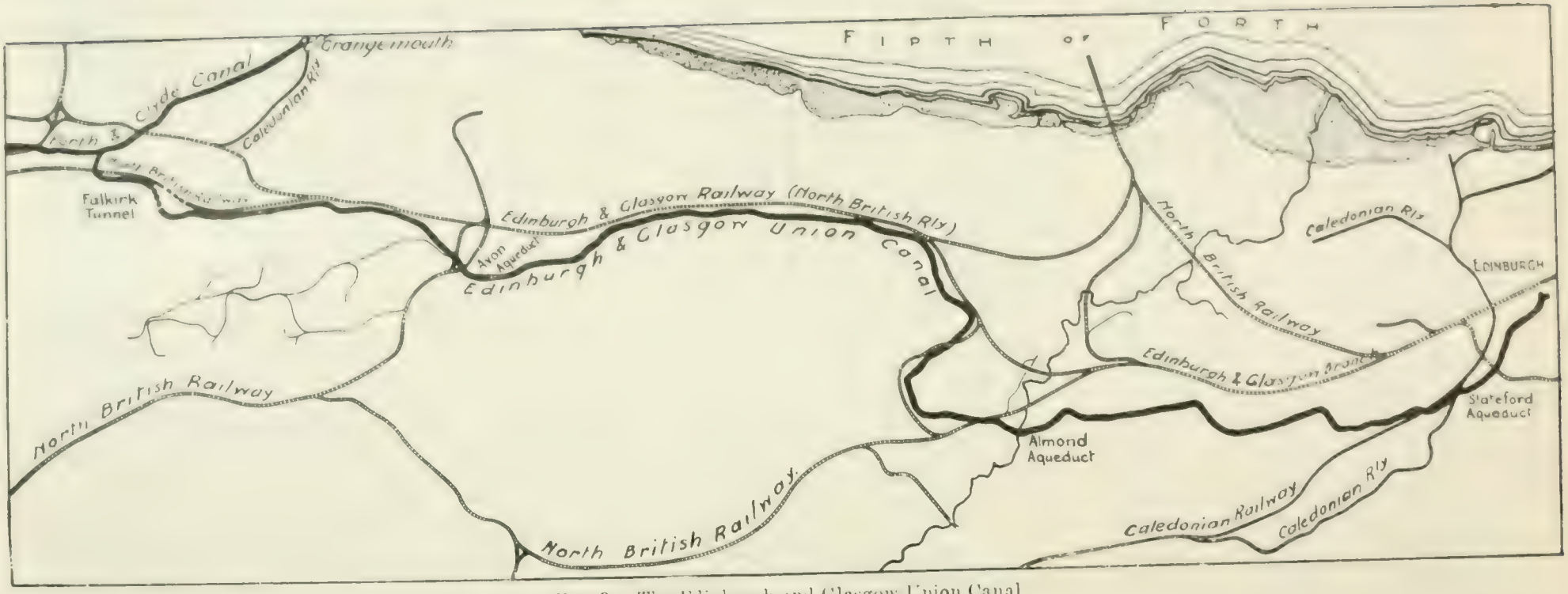

Fig. 2. The Edinburgh and Glasgow Union Canal.
(From Pratt's *Scottish Canals and Waterways*.)

1826, when the total cost was found to have further mounted to £600,000. While the cost of construction had been so largely underestimated, the probable eturn had been as greatly overestimated. Instead of an expected evenue of £55,000, during the first seven years less than £17,000 per annum was actually received. At one time five passenger boats during the day and three at night left for Glasgow every week-day, and there were abundant facilities for shorter excursions. But the opening of the Edinburgh and Glasgow railway in 1842 sealed the doom of the unhappy canal, and the revenue scarcely even met the cost of working it. The company first sold off the surplus horses, no longer wanted for the empty passenger boats, and in 1849 they were glad to be clear of their obligations by disposing of the moribund canal itself to the Edinburgh and Glasgow (afterwards the North British, and after 1922 the London and North-Eastern) Railway Company for £209,000, or about a third of what it had cost.

After it became the property of the Railway Company the decline in traffic continued, but the fabric is still maintained in good condition.

The traffic in	1888	was	129,000	tons.
,,	,,	1898	,,	112,000	,,
,,	,,	1905	,,	100,000	,,
,,	,,	1913	,,	65,118	,,
,,	,,	1921	,,	19,633	,,

In the last of these years the revenue was only £1169, and the number of boats in use thirty-two. These are mainly used for the carriage of coal, bricks, road metal, and police manure, most of which could nearly as well be conveyed by road or rail. The basin of "Port Hopetoun" on the Lothian Road has recently been abandoned and sold to the Edinburgh Corporation, and the canal shortened at the east end for the sake of much-needed city improvements.

The waterway is therefore practically useless as a means of transport. It has been suggested that it might be filled up and used as an additional road for motor traffic. No doubt the problem of a road along an old-existing line of thoroughfare would be simplified in one respect. Its acquisition would save dealing with more than one landlord, and there would be none of the usual claims for severance of land which a new roadway would involve. But for motor traffic it is too sinuous and also too narrow. It has a breadth of 40 feet of water and a towing-path of about 6 feet wide along the north side. But at all the aqueducts and the numerous bridges the width is constricted, and at Falkirk it runs through a tunnel 700 yards in length. At these bottle-necks it could not be widened except at an expense disproportionate to its probable value.

Another possible use might perhaps be made of it as a waterway without any considerable outlay. The canal runs just under the 250-feet contour line, and all the streams from the high ground to the south necessarily pass under it either at the aqueducts or in culverts. The main feeder at the east end runs from a weir in the Almond above

Almondell along a watercourse that enters the canal at Linn's Mill close to the Almond aqueduct. This supply is originally derived from the Cobbinshaw Reservoir on the high ground which was made to feed the canal, and discharges into the Almond by way of the Linhouse Water at Mid Calder. It runs for eight miles down these streams, and is taken out again above the level of the canal at the weir below Mid-Calder. This water flows along the canal to Edinburgh, where it is used at Fountainbridge for steam raising and manufacturing purposes.

But it seems probable that, as a conduit, more use than this might be made of the waterway. From the engineering point of view there would be little difficulty in catching on the high ground and collecting many of the streams that run under it so as to let them discharge into the canal at different places along its course. The additional water could then be drawn off at the Almond and Avon aqueducts, where there is a clear vertical fall of eighty to eighty five feet, and used to develop power. It would thus be still available for use as a boat canal, but, in addition, would be serviceable as a reservoir and a conduit with very gentle currents running towards power stations at the two western valleys. The tributary water belonging to the rivers would only be temporarily diverted, and would be returned to them at the tail races under each aqueduct. The streams that would be intercepted are mostly very low in summer, but in the wet months a considerable volume of water available for power might thus be utilised. If used for, say, local electric lighting, the power would be most plentiful in the dark months when most needed. Until the total discharge of the supposititious new feeders is gauged, it is of course impossible to say whether or not they would provide enough power to make the scheme financially practicable. But when coal becomes scarcer we must use to the best advantage even such small natural resources as this, and the fact of the canal being already on the ground, and of so little service otherwise, has led me to make this suggestion in connection with Mr. Pratt's narrative.

The proposed Forth and Clyde Ship Canal.

During recent years this subject has been much discussed, and there is still room for further discussion. The protagonists base their case on the advantage of a deep water channel for ocean-going vessels which at present have to pass round the north coast of Scotland in sailing between the North Sea and the Atlantic.

A ship canal would provide a safe short-cut between east and west, and would, it is also affirmed, promote industry along its banks. It would likewise be useful in time of war for naval purposes, and in any case the enormous works of construction would give employment to a large army of workmen badly in need of useful occupation. These are the chief arguments in favour of the scheme.

The eastern half of the route and the natural features and industrial needs of the district are well known to me, and if the plan could be

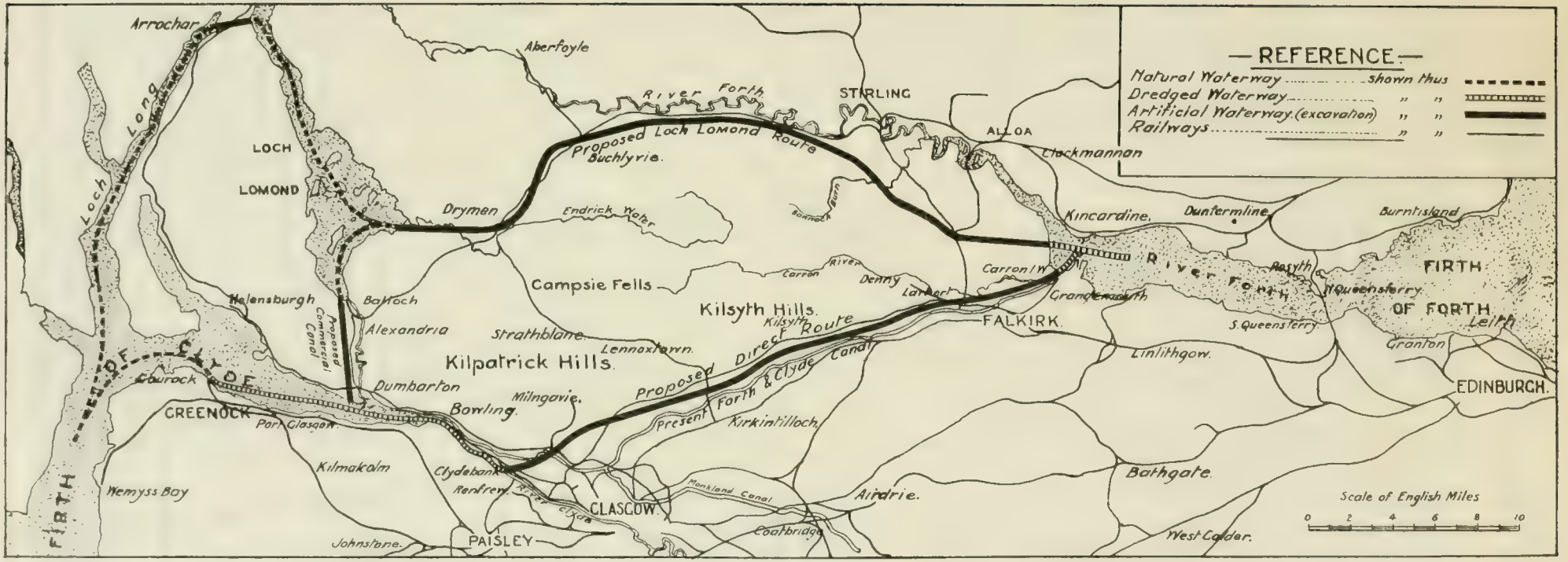

FIG. 3.—The proposed Mid-Scotland Ship Canal routes.
(From Pratt's *Scottish Canals and Waterways*.)

shown to be economically or physically feasible I would be the first to support it. But after long study I am quite unable to see how the proposed vast expenditure is justifiable at the present time, and believe that the ultimate result would be productive of more harm than good. In the case of the other canals, although the original estimates were framed by the most eminent engineers of the day, they were all found totally inadequate, and as Mr. Pratt's figures show, the works ultimately cost three or four times the sum that had been anticipated.

In this case the sum estimated has already grown with each calculation to a prodigious figure, and the problem is further complicated by the matter of two opposing routes. The supporters of each route maintain that theirs is the only possible line for the canal if it is ever to be of general use, and between the disputants the outside public remains quite befogged. Let us examine both schemes shortly.

The direct route follows the Bonny and Kelvin valleys nearly along the line of the present Forth and Clyde Canal. It is almost straight and passes at each end through an industrial district between the Forth and Glasgow. The second or Loch Lomond route, which is more circuitous, runs up the valley of the Forth by the south side of Stirling to the eastern corner of Loch Lomond, and reaches the sea by way of the low and narrow neck of land between Tarbet and Arrochar at the head of Loch Long. Here there is almost no industrial population and the track lies through highland moorlands on the west and pastoral or agricultural ground in the Forth valley.

We shall look at the Loch Lomond route first.

This is the route recommended by Messrs. D. and T. Stevenson, C.E., as the best for ships that wish a through passage only, as well as the only one which satisfies naval requirements. It is intended for vessels which do not need to visit Glasgow, but which can enter and leave the Clyde where the estuary is wide and less congested than in the upper reaches. It is also probably much the cheaper of the two, and in any case it traverses land of small value, and ground that is crossed by fewer roads and railways than the direct route. These last are important advantages to be noted.

But there are equally notable drawbacks. The most important of these is the consideration that since the canal will not come near Glasgow, the western traders will not give it any support, and without strong support from the whole commercial community the plan is predestined to failure. A canal for naval purposes alone would be far too costly a national luxury, and indeed the Admiralty have never evinced much cordiality to the proposal. There is not now the same fear of attack by sea as there is by the newly developed air forces of a possible enemy, and the likelihood of a war in which a ship canal would be of national service is more remote than it was before 1914.

In a paper read before the Royal Scottish Society of Arts in 1910 and published in the Society's *Transactions* in 1914, Mr. D. A. Stevenson, C.E., described the Loch Lomond canal scheme recommended by his

firm, and summarised its advantages. The canal would enter the Firth of Forth above Grangemouth where there would be tidal locks, and run along the south side of the Carse through the Field of Bannockburn. It would pass along the south side of Stirling by a rock cutting 191 feet deep, and follow the southern edge of the Vale of Menteith above Stirling to the Forth water parting. Here the line is crossed by the southern end of the Ben Lomond ridge, where for a short distance a cutting would be required no less than 285 feet deep before the canal could be connected with Loch Lomond. The last cutting through the low pass between Tarbet on Loch Lomond and Arrochar at the head of Loch Long would be $1\frac{3}{4}$ miles long and 160 feet deep at the highest point.

As Loch Lomond is about 23 feet above the sea at Loch Long a lock of this height would be necessary at the Arrochar end. The canal would be on the level of Loch Lomond, and the total length of excavation would be 30 miles. The whole length of the waterway from the Forth above Rosyth to the Cloch Lighthouse is 51 nautical miles along this line. The depth of water would be 36 feet and the canal cutting 100 feet wide at the bottom with slopes corresponding to the nature of the ground.

One important advantage of this route over the direct route is the smaller number of railways that cross it. The principal line with the greatest traffic is the Caledonian north of Larbert (now the London, Midland, and Scottish Railway), then come the Forth and Clyde Junction line at Balfron, and the West Highland (now London and North-Eastern) at Arrochar. All of these, as well as most of the roads, would be carried over the canal by fixed bridges, giving 120 feet of clear headway above the water. Only seven swing bridges would be required for the roads at a lower level.

At the time Mr. Stevenson prepared his plans he estimated that the total cost would come to £20,012,500. The quantity of material to be excavated would be 170,000,000 cubic yards, which is no doubt the largest item in the estimate. But since 1910 the cost of such work has greatly increased, and much of the excavating is through solid rock requiring blasting. The material must also be taken away and deposited at a distance of perhaps more than a mile from the cutting, and at the present time all this work would probably cost not less than 5s. per cubic yard. At this rate the excavation alone, apart from locks and bridges, would cost £42,500,000. But here there may be unforeseen difficulty. The cutting between Tarbet and Arrochar may not be so easily accomplished as Mr. Stevenson supposes. It so happens that I was engaged many years ago on the geological survey of that district. I then noticed that along the foot of the mountain slope of Ben Reoch, which would skirt the south edge of the canal between Tarbet and Arrochar, there were great master joints, and along some of these numerous rents appeared in the mica schist of the mountain. These ran parallel to the valley and marked incipient landslips. The side of Ben Reoch was opening up so that stones could be dropped for considerable

distances down the fissures. At other places round the head of Loch Long considerable landslips had already occurred on the steep mountain sides. If the proposed cutting were made here it would be likely to weaken the support at the foot of the slope, causing the unstable mass of rock to slide in, like the rock at the Culebra Cut at Panama, and add greatly to the cost as well as the danger of the work.

Another and later report on this canal route was made in 1917 by Messrs. Sir W. G. Armstrong, Whitworth, and Co., Ltd., Civil Engineers and Contractors. This contemplated a larger waterway suitable for the greatest warships, with a minimum breadth at the bottom of the side slopes of 150 feet and a depth of water of 45 feet, with tidal locks only at each end. The reporters had no hesitation in concluding that compared with the direct route the Loch Lomond route "possessed undeniably greater advantages, particularly from the point of view of the cost of the work." Although this canal was to be 50 feet wider at the base than Messrs. Stevenson's, the estimate of cubic yards of excavation was only 155,000,000 against Stevenson's figure of 170,000,000. The final cost was put at £33,562,436, but with the addition of a branch for commercial ships connecting Loch Lomond with the Clyde by the Leven Valley it would be £38,513,004. During the years that have passed since 1917 there has been a considerable rise in prices, and probably even this figure would be inadequate now.

The Direct Route.—The main difficulty in the way of the Loch Lomond route is its great expense, but in the case of the direct route this obstacle is greater still. This canal would admittedly be of much less use to the nation for naval purposes than the former, as it would end in the upper part of the Clyde, which is already congested with shipping. It would be an almost purely commercial waterway between the east and west coasts, and its value would depend on the sum of its benefits to the country as a whole. If it is to be looked upon as a national undertaking, it must not be designed to benefit one district at the expense of other places, and the interests of all must be duly considered.

This is the most important of recent canal proposals, and in discussing it from an impartial standpoint we may first consider the engineering factor, and deal with the commercial aspects afterwards. Geologically, the canal follows the almost straight course of an ancient and derelict river valley across Scotland. This is now occupied by the insignificant stream of the Bonny on the east, which joins the Carron to the west of Camelon, and on the west by the river Kelvin, which runs from the watershed at Kelvinhead past Kilsyth and Kirkintilloch to the Clyde at Glasgow. These streams have been proved by boring to run over the channels of far older rivers, and the buried gorges of these pre-glacial streams are filled with beds of sand and clay, at places more than 200 feet in depth. The underlying buried channels are somewhat sinuous, and towards the watershed the rock comes up nearly to the surface, so that the straight canal cutting would be partly in solid rock and partly in loose material along practically the whole of its course.

We need not consider the original proposal for a high-level ship canal with several locks at each end, for there is not an adequate water supply for this. Indeed in dry weather the supply for the existing barge canal is barely adequate, and for large vessels a canal at sea-level is the only kind of waterway that has any prospect of being useful.

This proposal was investigated by Armstrong, Whitworth, and Co., along with the Loch Lomond scheme, and their estimate for a direct sea-water canal, with top water level 7 feet above Ordnance datum, came to £57,572,836. This is £19,000,000 more than the Loch Lomond estimate, including the branch canal; and in the face of such an immense figure the promoters of the direct canal must present a very strong case indeed if public approval is ever to be won.

The material to be excavated and dredged was taken at 253,000,000 cubic yards, and the promoters said this would be useful in reclaiming the Forth mud flats, of which about 3000 acres are reclaimable on the south side of the Forth between high and low water mark. But this is not such a simple matter as it looks. To fill up the 3000 acres with an average depth of 12 feet of material, which is all that would be required to raise the whole of the mud-flats above sea-level, would only use up about 58,000,000 cubic yards. There would still be 195,000,000 to be got rid of, half presumably by way of the Clyde and the rest in the Firth of Forth. The bed of the estuary is for the most part already far too shallow, and the Forth Conservancy would never permit of this immense mass of material being dumped into the channel, except perhaps into the deep water far beyond the bridge. To get rid of it beyond Inchcolm would involve a large fleet of barges making a voyage of twenty-five miles out and twenty-five miles back, and this would be a very slow and costly operation. If it were not so disposed of, the only other way would be to heap the débris up near the canal, or to make the proposed reclaimed land much higher, and this would involve lifting it up some distance. The land so gained would consist of stones and sand, worthless for agriculture and not nearly all required for industrial sites. Any other dumping ground that might be acquired would be quite destroyed for farming purposes. It is not probable that at the Clyde end the facilities for dumping would even be so favourable. The Clyde Trust are as jealous over the interests of their river bed as the Forth Conservancy can be over theirs, and there is less room in the west coast than in the east for disposing of such an immense volume of rubbish. These objections are not referred to by Mr. Pratt.

Another engineering point may be mentioned. It is claimed that the construction of the canal through a mining district would benefit the coal industry. Now there are coal-mines at the Falkirk end, and also in the Kilsyth district and elsewhere on the line of the canal. The existing barge canal crosses some of the coal-workings and suffers damage by the leakage into these mines. At the same time the mine-owners have to pump out this additional water, and both parties accordingly suffer. The rock is generally covered by a bed of boulder clay

which helps to protect the workings from the water in the soil above, but if a deep trench were cut through the clay and far into the strata below, the damage would be infinitely greater. There are unworked coal-seams at some places, and at others there are old "wastes" or empty cavities where the coal has been already worked, communicating with other parts of the coalfield in the vicinity of the canal. It would be impossible at such places to prevent the wholesale flooding of the coalfields. The canal authorities would therefore require either to pay very heavy damages or else purchase the collieries and the mineral rights that had been destroyed by the waterway, all of which would add considerably to the whole cost of the undertaking.

The highest part of the valley bed, at Kelvinhead, is about 150 feet above Ordnance datum, and the level of the existing canal surface is 158½ feet. There is here a level reach of 16 miles on the summit nearly 150 feet high, and the whole extent of ground above the 100 feet level is about 20 miles. At the watershed the valley is occupied for a considerable distance by the Dullatur Bog, a peat moss more than 50 feet deep, which caused, as we have seen, much trouble to the engineers of the old canal. A deep cutting here would have to pass through the morass and clear it out to the bottom so that the pulpy mass would not slide in. At the east end there is a wide plain of sand filling the buried river bed, in the Larbert and Camelon district. Excavations for drains and deep sewers have shown that the lower part is of the nature of a quicksand, full of water and quite unstable when opened. A deep cut through this shifting subsoil would require very flat slopes, and this would involve not only much additional excavation but the acquisition of a sufficiently broad strip of land on each side at a place where the land is largely occupied by buildings and public works of much value. In the central twenty miles of the cutting, where it is all more than 100 feet deep, the material must needs be transported farthest. There is no room to deposit it in the vicinity except at great expense. If it were hoisted up and dumped along the sides of the trench the chasm would become still deeper, and it would be more difficult for road traffic to descend to the low-level bridges and climb the opposite side.

All the railways would have to cross either by level swing bridges or by others as high above the water as the Forth Bridge, with a clear headway of 120 feet. At each low-level swing bridge for road or rail, an attendant, or perhaps two or three, would be required to work the mechanism by day and night. In the case of the direct route, the canal is crossed by nine railways—four main and five branch lines—as compared with only one main and two branch lines across the Loch Lomond route. In the deeper excavations, high-level bridges would not, of course, interrupt the traffic, although such lofty structures would be very costly, and must be upheld in all time. If the canal were to be of any commercial value, or were to obtain adequate traffic to produce the large revenue necessary to make it remunerative, a constant stream of vessels would have to pass along it during the day. The swing bridges would

thus have to be nearly always open, and this would entirely upset the traffic on both roads and railways. No railway train or motor vehicle could ever be sure of getting across in scheduled time. If, on the other hand, the bridges were generally closed for the sake of the land traffic, the ships would be greatly delayed at the many stoppages, and would for this reason avoid the canal route when possible. Where the surrounding ground is low, high bridges would involve long inclined approaches on the railways, and additional engine-power would be necessary to haul the trains up the new inclines. Whichever way we regard the question, it is full of difficulties, and from the engineering point alone it seems far from practicable. These drawbacks must be shown to be small in comparison with the countervailing benefits that will accrue, if the plan is to meet with general approval.

Another and very important point is worth mention here. The construction of such a chasm across the country, transgressing the many busy roads and railways and causing great inconvenience to the public, if once commenced must needs be finished from end to end as soon as possible, and not abandoned for want of money. The liability of any corporation undertaking it would be practically unlimited until the kyle across Scotland joined both seas. But this unknown liability would not end here, for there would always be much dredging required at each end to keep the mouths open for large vessels, the bridges must also be kept up, and each swing bridge and tidal lock would require its working staff, whether the canal traffic were great or small. Such an undertaking would be far beyond private enterprise. Like the Caledonian Canal, the work would have to be all, or mainly, done by the State, and after a time, if the cost greatly exceeded the estimates, and the national exchequer happened to be impoverished, the old question of abandonment would certainly arise in Parliament. But here the abandonment would be far more costly than in the case of the northern waterway. The canal could not be filled up and the roads and railways restored to their present serviceable and safe condition without vast additional unremunerative outlay and trouble, and neither the railways nor county councils could be expected to undertake it. The land that had been destroyed could not be used again for agriculture or industry along the crumbling sides of the steep glen. Thus, the canal, once made, must be kept up by the canal owners, even if it had to be maintained at a large annual loss. The cost of abandonment might be greater still, and for this reason the project requires the closest scrutiny at the very outset.

Now let us look into its economic aspect. It is alleged by the promoters that local industries would largely benefit by the proximity of a ship canal as it would facilitate both imports and exports from riparian works and factories. A deep waterway such as this, to be of any benefit to the adjoining district, would require numerous wharves near the adjacent works. The canal would have to be widened at these places, as well as at others to allow vessels to pass, and much additional excavation would be required in the deep ground. Unless these local docks were

placed conveniently near the works, they would be of little use to the traders. The goods from the works must be put on rail and sent to the ship's side, either by means of private railways or by the existing lines. The Caledonian Railway has already good docks at Grangemouth that cost over £2,000,000, and it is highly improbable that the company would willingly provide facilities for opposition docks so near their own harbour. Private traders would object to laying new rails, however short, to the canal wharves while they already have sufficient railway connections to convey their goods to the existing seaports. As the canal would be for the most part about 100 feet below the existing ground level, local users of it must needs also provide cranes to lower or raise their goods from the one level to the other, and this would involve another handling with its attendant risk and expense.

But there is a further important difficulty. Modern ships, as a rule, are too large to take a cargo of only one class of goods, or sometimes even a whole cargo of coal from a single colliery. They generally carry mixed cargoes from several places, and unless the vessels are small the variety of such goods may be considerable. A steamer of 1000 tons with consignments of say 50 tons each for twenty different destinations along the canal would have to stop at twenty different places like a postman delivering parcels along a street. The stoppages and delays at each landing-stage would be perfectly intolerable, and in the end the vessel would have to deliver the goods at only one or two stations, the rest of the cargo being conveyed by rail between the canal wharf and its destination. In the same way it would have to pick up the cargo at as few places as possible, presumably at only one or two.

But here there is no part of the ground farther from a good harbour than about 15 miles, and as there is very little industry in the central section, the places likely to benefit are within 12 miles of Glasgow or 10 miles of Grangemouth, at the west and east ends respectively.

As matters stand, there is a railway line along each side of the existing large canal, and although the canal passes close to various factories on the ground level, the owners now find it more convenient to use the railway connection than the old waterway. The rails not only come to their doors, but run into any part of the works that may be desired. Coals from distant collieries, for example, are brought right up to the furnace doors of the boilers without being broken by transhipment and without double handling, which involves both waste and unnecessary expense. It is safe to assert that in the great majority of cases traders will prefer to use the existing abundant railways and large docks rather than a ship canal with small wharves, even if it runs close past their doors and is a little cheaper in appearance than a railway.

It seems therefore clear enough to any one who will look the whole facts squarely in the face that, so far at least as promoting local industries along its banks is concerned, the proposed ship canal would be of no additional use whatever.

There remains the question of through traffic to consider, and the

attitude of the traders and the railway companies who would be affected, as well as the taxpayers who in the long run would have to foot the bill. Here, no doubt, is to be found the sole argument in favour of the scheme, but the question still remains, Would the advantage of the waterway be sufficient to counterbalance the drawbacks? And is there any prospect of the revenue being in the least degree commensurate with the expenditure?

The latest estimate, as we have seen, by Sir W. G. Armstrong, Whitworth, and Co. puts the cost at £57,572,836. This is an engineer's figure, and in view of the probable large claims for damage to mineral-fields and other property, as well as the cost of disposing of the material, and of many other unforeseen contingencies that all the previous canals have had to meet, it is highly probable that this one would cost at least 50 per cent. more, or say nearly £90,000,000, before it could be opened for navigation. To repay this the traffic should produce a revenue allowing for interest and sinking fund of say 5 per cent. or £4,500,000 a year. The estimate also puts the time required for construction at from ten to sixteen years, which seems a very moderate computation. Therefore there would be no revenue and only a great outlay for the first sixteen years or so, and the interest on the capital expended during that period would for practical purposes have to be included in the total cost.

Now to ascertain the probable revenue is a very difficult matter. If the rates were put too high the canal would hardly be used at all. In Mr. D. A. Stevenson's paper in 1910, when trade was normal, he made an estimate of the probable through traffic on the Loch Lomond route. He thought that shipping (based on the Board of Trade returns for 1907) which would take advantage of that route might reasonably be computed to carry 10,724,805 tons. At a rate averaging 1s. 6d. a ton this would give, after deducting £60,000 for maintenance, a sum of £744,360. These figures are quite hypothetical, but this is only about a sixth part of the sum required to make the direct route pay its way and gradually repay the capital. In fact, it does not need any further argument to prove that from the financial point of view the ship canal project is absolutely indefensible.

Now we have to look at the various interests that would be affected, and this is one of the most important considerations. When the original barge canal was first proposed, as mentioned on a previous page, the Glasgow traders presented a Bill in Parliament for a canal that was to lead from Glasgow to the Forth without any connection with the Clyde, so that Glasgow alone would benefit. But this was opposed by the business community in the east of Scotland, who defeated the Bill and obtained an Act for a complete sea-to-sea waterway that might be of use to both sides of Scotland.

In the present case the ship canal scheme is supported by very few traders outside of Glasgow, and even among the western shipowners the support is by no means unanimous. They think that it might bring

more trade to the west, while at the same time perhaps American or Atlantic going craft might use it to bring cargoes of grain, etc., to Leith and the eastern ports. But this view is stoutly opposed by the Leith traders and Chamber of Commerce, who maintain that much of their commerce with Europe and Scandinavia would be diverted past their own doors and their business would be seriously injured. The large docks at Leith and Grangemouth were constructed at great expense in order to distribute over the east of Scotland the seaborne merchandise from the North Sea and the Baltic, and also to collect and export coal and other outward bound commodities, and a canal would not do this work any better than the existing railways and harbour.

The subject was discussed at the meeting of the British Association in Edinburgh in 1922. Mr. H. A. Salvesen, a leading shipowner at Grangemouth with long experience of this class of trade, gave his valuable opinion on the prospects of the canal. In connection with the question of the direct versus the sea route between the east and west, a shipowner has to consider the total saving of time and money as against the additional cost of the voyage owing to canal dues. A large steamer can go full speed ahead at sea but only dead slow in a canal, especially where other ships have to be passed and swing bridges crossed, involving a loss of much time. Mr. Salvesen, taking into account both these factors, and also the risk of damage to a vessel in such a narrow channel, arrived at the conclusion that a tramp steamer going from Glasgow to the Baltic would by using the canal save only two days and have a dead monetary loss of £304. In his opinion the whole scheme was "absurd and impossible from a commercial point of view." None of the supporters of the proposal who were at the meeting was able to give any satisfactory reply to these objections.

A ship canal scheme to be of truly national service should not, while possibly benefiting one community, have the effect of almost certainly doing harm to others. The railways to the eastern ports, and especially Grangemouth, would doubtless be injured by the diversion of traffic past their harbours to Glasgow, and it seems very doubtful if there would be sufficient compensating advantages.

I have no brief for any of these interests, and am taking an entirely academic survey of the whole field as an impartial spectator, but mainly as a much oppressed taxpayer, anxious if possible to stop waste of good money, and to spend it only on works with some prospect of future productiveness. No doubt any of these schemes would provide much employment to navvies—so would the demolition of Arthur's Seat—but in the end, unless the work proved financially sound, there would be less capital left for really useful operations. The final loss would be productive of still more unemployment and public indebtedness. It might, as we have seen, not only prove financially unsound but also positively injurious to a wide locality. Such a mistake once made could never be remedied and would be a source of needless expense and trouble for all time.

The historical facts and figures in this paper, and the illustrations, are derived from Mr. Pratt's admirable volume, and with his general conclusions I am in full agreement. To these I have added some additional notes from my own acquaintance with the Forth District and the Ship Canal Schemes.

To sum up the whole case, the evidence discussed in these pages leads to the following conclusions :—

(1) Each of the four canals in Scotland cost several times the original engineers' estimate, showing that all such estimates are unreliable.
(2) None of the canals since the development of railway transport has been commercially successful.
(3) The most promising proposal is that of making a new and enlarged Crinan canal at comparatively small expense.
(4) The reconstruction and enlargement of the Caledonian Canal is worthy of consideration.
(5) The proposed Forth and Clyde Ship Canal is absolutely impracticable, but of the two routes that by Loch Lomond is the least objectionable.

PTOLEMY'S MAP OF DENMARK: A STUDY IN CONFLICTING EVIDENCE.

By I. A. Richmond.

(With Map.)

Not long ago the writer applied the method of Rylands to the elucidation of the Ptolemaic map of Scotland. For the result, now published in the *Proceedings of the Society of Antiquaries of Scotland*,[1] there may be claimed at least agreement with what has been revealed by recent research.[2] The underlying principle was that of looking for a clash between data derived from astronomical observations and those from what the geographer calls "geometric" sources, among which may be classed chiefly those road-books of which the Antonine Itinerary is a notable example. This method produced a satisfactory solution for most of the problem. The residue was explicable by a second but incomplete recension of the materials composing the British πίναξ.

At the time when the paper on Ptolemaic Scotland was read Dr. George Macdonald pointed out to the writer that in Denmark there was a distortion parallel to that of Scotland which might be solved by the same method. It is worth while to note parenthetically that this does not follow, since a distortion might occur where one class of data was not

[1] *Proc. Soc. Ant. Scot.*, 5th series, vol. viii. p. 288.
[2] *Journal of Roman Studies*, vol. ix. pt. 2.

present to check the other, while textual corruption and real ignorance or paucity of detail also might have their part to play. But this case did seem to be of sufficient interest for investigation. The result of this inquiry is given below: it vindicates once and for all the soundness of the line of inquiry which Rylands perhaps indicated rather than employed—for his book is the muddled result of bad editing—and which is of real importance for a right understanding of Ptolemy's method and for the solution of certain problems in his Γεωγραφικῆς ὑφηγήσις.

Fig. 1 shows Denmark, the Kimbric Chersonese, as Ptolemy mapped it out. It also shows the surrounding coast to the east. It is easy to pick out the rivers Elbe (Ἄλβις), Oder (Σουήβος), and Vistula (Οὐιστούλα): but at this point close resemblance ceases to exist. The middle of the southern coast of Sweden, for example, is situated too far east and opposite the mouth of the Vistula. And the land of Sweden itself, through insufficiency of data and failure to explore openings like the estuary of the river Laga and the Kalmar Sound, is mapped as an island of which the area is approximately that of the old Swedish division Scania. Nevertheless the position of Σκανδία gives the clue to the solution of the question. For in a later book of the *Geography* [1] it may be found in the list of points determined by astronomical data. Thus it is clear that if the position of points along the Germanic coast was determined by some sort of naval survey, with a base which would be in the west for very obvious reasons, and, on the other hand, the position of Σκανδία was obtained by means of astronomical observations, then a clash between the data might well occur: for points in the west of Europe were already situated four degrees too far west through faulty projection.

It is permissible to take for the middle point of the south coast of *Scandia* the modern Sandhammar, which lies due north of the mouth of the Oder. This makes necessary a moving of the southernmost point five degrees to the west, which of course must apply to the rest of the island, to the *Scandiae insulae quattuor*, and to the northernmost "naze" of Denmark, the well-known "Skaw." Then it will be seen that the Skaw is the right distance from the bay of Lubeck, the turning-point of the coast at the south-eastern corner of the Peninsula. This fact is important as suggesting that the coast may have been lengthened when it was distorted. But, as may be thought natural upon consideration, this happened only to the western coast. On the east the distance from the Skaw to the Fornäes is the same as that from the northernmost "naze" to the one south of it: while that between the latter and the turn of the coast must fit then as the well-defined "naze" opposite the island of Alsen. Therefore this coast was straightened to the requisite length only, and not lengthened in reality. In passing it is worth note that since neither Funen nor Laaland is mentioned, information about the "Alsen" naze may have been obtained by hearsay: and this suggestion

[1] viii. 6.

is strengthened by the fact that the bay of Lubeck is nameless, and is called simply the "Turning-Point."

The western coast, however, must have been increased to make an

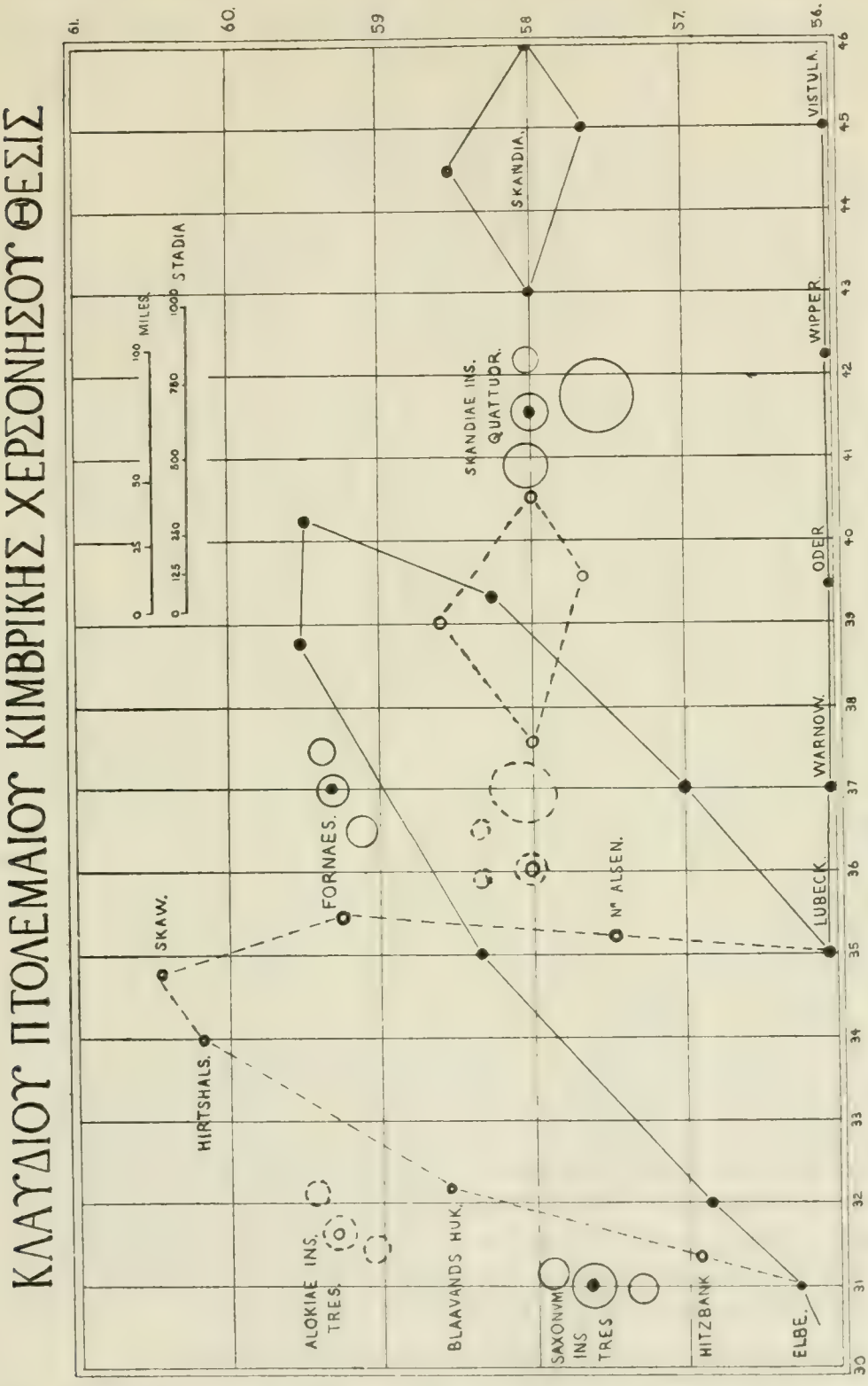

FIG. 1.—Ptolemy's Map of Denmark, with reconstruction (dotted lines).

angle large enough to meet the distorted eastern coast. The increase is one degree fifteen minutes in six degrees, which, for approximate purposes, is a ratio of 3 : 4. And when the coast is plotted afresh in this ratio

the results are fairly good. The "naze" by the river Elbe becomes the Hirshank, just west of Tonnen. The "first naze" is Blaavands Huk. The *Scandiae insulae tres* and the *Holmae insulae tres* are the North Frisian Islands and the lands north of the Lum Fjord respectively. The "northernmost (or) naze" falls south-west of the Skaw, probably Hirtshals. It is noteworthy that all these nazes and islands are precisely such features as would be noted in a well-conducted survey which was not meant to be more than rough: and this whole section of the *Geography*[1] has all the appearance of such a report.

So far as the Baltic regions are concerned, this sheds some light on the method of surveying the "Outlands" in Roman times. Certainly a coastal survey was taken—one which apparently kept away from the dangerous coasts between Zealand and Lubeck: but how was it measured, and how were the measurements checked? A small point like the inclusion of a fraction of a degree in the position of the *Viadus*, the river Wippau, suggests that the measuring was done by more accurate methods than the computation of so many hours' sailing before or against the varying wind. It raises the question, for example, whether the Roman war department ever used such an instrument as might be developed from that mentioned by Vitruvius, a rotary ship's log?[2]

Also it may be asked whether it was customary to check the observation of the farthest point explored by taking an astronomical bearing. If not, how did Ptolemy obtain the astronomical observation from *Scandia*? In these days of science the answer "anyhow" is perhaps too easy to be true. A little-known passage in Plutarch[3] tells of an expedition of coasting surveyors in the Caledonian Ocean, which was sent out for the express purpose of exploration and which carried with it at least one man of letters. For one such expedition, not spoken of as anything extraordinary, it may be assumed that there were more,[4] and perhaps more "scientists" interested in such practical matters in the Roman world than this age of science has been prone to suppose.

But apart from these conjectures, this inquiry about the Kimbric Chersonese has a practical value. It proves the real worth of Rylands's method for the elucidation of the Ptolemaic geography, and provides a new instance of that clash between his two classes of data which the geographer himself notes to have occurred. It also provides a simple and uncomplicated example of the method which the writer has used in investigating the map of Scotland: for the Scottish map is complicated by the confusion of an incomplete recension. For Denmark there probably never was more than one set of facts which were written down in some log-book of frontier surveying; and for this reason it forms something like a *locus classicus* for Rylands's method.

[1] II. cap. 11. [illegible] 23, 24 and 31, 35.

[2] Vitruvius x. 9, edition Holtze, Leipzig, 1869; x. 11. Teubner.

[3] *De defectu oraculorum*, cap. 18.

[4] Cf. Mon. Ancyr. [illegible] 14. "Classem meam per oceanum ab ostio Rheni ad solis orientis [illegible] ad fines Cimbrorum navigavit. A.D. 5."

THE DANUBE AS A WATERWAY.[1]

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(*With Sketch-Maps and Illustration.*)

The use of the term waterway implies navigability. But what exactly is meant by the statement that a stretch of water is navigable?

The atlases mark with an anchor the head of navigation of all the larger rivers, but they cannot tell us by what kind of craft these rivers are navigated. The geography text-books could, but they do not.

The Thames is marked as navigable up to Oxford, but the head of navigation for the great liners is at Tilbury, and London Bridge is the limit for most ocean-going vessels. The tiny colliers, like the famous *Wandle* that attacked the submarine, can get up as far as Hammersmith, it is true, and there is an increasing barge traffic up to Richmond: beyond that, the little flat-bottomed pleasure steamers will take you up to Oxford, whence you may proceed up-stream for some small distance in a punt or rowing-boat . . . but if it comes to that, the Round Pond in Kensington Gardens is navigable.

It is obviously necessary, then, before we go any farther, to define our terms. The following table, showing the types of craft that navigate the more important European waterways, will serve to give a general idea of the relative importance of those rivers and will also give us a rough basis of measurement. A waterway that is not deep enough to be navigated by vessels carrying a two-hundred-ton load can hardly be considered navigable in the economic sense.

Types of Barge Used on the Main European Waterways.

	Tonnage.	Draught in metres.
French and Belgian canal "Péniche"	280-300	1·8
Danube (above Iron Gates) . .	600-800	·5 to 1·0
Rhine-Herne canal . . .	1300	2·5
Mainz to Frankfort . . .	1600	2·3
Largest Elbe boats in Bohemia .	1150	
Larger Rhine barges . . .	3580	2·85
Smaller Rhine barges . . .	1500	2·5

It is not, however, sufficient for a waterway to attain to a certain depth to be navigable: it must reach that depth for the greater part of the year if it is to be of real commercial value. It will be of little use if it is a raging tearing torrent for part of the year and a miserable

[1] A paper read before the British Association at Hull, 1922.

trickle for the rest. Again, the velocity of the current is a very important factor in determining the value of a waterway. The Rhine above Strasbourg is navigable, if one is prepared to pay the cost of extra powerful engines and a vast amount of fuel. It used to take a hundred men to tow a boat up before the days of tugs. Such conditions may be all very well at the Ichang gorge in China where labour is cheap *and where there is no competing railway*, but are impossible in Europe. On the other hand a river must not be too sluggish, especially if it is bearing down a large quantity of silt, otherwise it will not be able to scour its channel and the cost of dredging will have to be taken into consideration. The dangers and delays caused by ice and flood, mist and fog, may be so considerable as to mar the value of a river as a waterway.

Moreover, we must recognise that, however navigable a river may be, its geographical or political position may be such that it is not navigated. To make a waterway a commercial success there must be people at either end of it who have goods to exchange and the will and organising capacity to exchange them.

Finally, when we have taken all these things into consideration, there still remains the question of the competition of other routes and other means of transport and of the extent to which the cost of engineering improvements can be repaid by increased traffic.

Of course it is impossible to discuss all these considerations in detail within the scope of the present paper. There are many questions involved that cannot be discussed with advantage by geographers at all. Nevertheless, the geographical factor is such a very important one where transport is concerned, that I think it will be of interest to examine very briefly some of the points mentioned as they affect the Danube waterway.

From its length, volume and course east to west through the great mountain barriers of Europe, one might expect the Danube to rival the Rhine and Elbe as a carrier of passengers and merchandise; but as the following figures will show, it is very far from fulfilling the function of a great transcontinental carrier, very far from rivalling the streams of the North European Plain, or even maintaining the position it held as a world thoroughfare in classical and mediaeval times. It is now a waterway of only third-rate importance at best.

TRAFFIC CARRIED ON GERMAN WATERWAYS 1912.[1]

	Tons of 1000 kg.
Oder system	11,000,000
Berlin canal system	18,500,000
Elbe system	25,700,000
Weser-Ems-Jade system	9,500,000
Rhine system	75,000,000
Danube (Bavarian)	700,000

[1] Figures given by Dr. Hugo Danner, 1921.

TRAFFIC ON VARIOUS DANUBE REACHES, 1912.[1]

	Tons of 1000 kg.
Bavarian Danube	433,636
Austrian ,, ...	2,590,000
Hungarian ,, ...	5,093,000
Roumanian ,, ...	5,183,668
Bulgarian ,, ...	612,000

N.B. None of the Danube figures are reliable, as no two ports seem to have the same method of keeping records of traffic. There is probably much overlapping in the second list.

In the light of the above-mentioned considerations, let us inquire why it is that the Danube compares so unfavourably, from the point of view of traffic, with other great European rivers.

In the first place there are a number of serious hindrances to actual navigation. The upper section of the Danube from Donaueschingen to Ulm lies between the upper and middle basins of the Rhine, which river has cut down to a lower level than its neighbour, and has been able to prevent the Danube from increasing its catchment basin. As a result, the Danube here flows through a deeply trenched valley far too big for it, and gets its floods in spring and early summer from rain in the Black Forest and snows on the outer edge of the Alpine rim. In late summer, autumn, and winter it can only be kept in existence at all by a series of weirs. An interesting description of the possibilites of navigation in this section may be found in Macgregor's *A Thousand Miles in a Rob Roy Canoe.*

Low water occurs in the Bavarian Danube chiefly in winter when the Alpine reservoirs are closed ; but a long dry summer also makes itself felt in the upper reaches by August. Regensburg is nominally the head of navigation (some would call Ulm the head), but during last summer, for instance, the passenger service between Regensburg and Passau had to be discontinued and between Passau and Linz only very small, flat-bottomed boats could be used. The amount of traffic varies greatly from year to year, according to the depth of water, but the upstream traffic to Regensburg is generally only about half the downstream traffic, for the bulk of the grain, which forms the most important item in upstream traffic, is distributed by rail from Passau. Timber is the most important commodity that comes up as far as Regensburg. Low water is especially serious in those sections where rocks come near to the surface, as for instance at the Grein, Jučand Izlaz rapids, where the river is cutting through rocks that resist erosion in the Frankish Jura, the Böhmer Wald and the Banat Highlands. It is also serious at the confluence of large and ill-regulated tributaries in the plains, that of the March, for instance, near Bratislava, where banks are constantly forming and changing their position.

Ice is a danger for three or four months every year. It forms first

[1] Figures published by Danube Conference at Budapesth, 1921.

in the lower reaches and then in the Bavarian stretch. Only in certain parts of the river does the stream actually freeze over, but running ice is a great danger, especially when the floods come in the early spring. Special refuges for tugs and barges overtaken by ice are provided. These are known as winter harbours. There is an important one at Passau and another at Fischamend, a little below Vienna. But there are not nearly sufficient of these shelters and at least half the Danube traffic goes off the river during the winter months.

Ice coincides as a rule with the low water danger, and is especially obnoxious because it often begins just when the grain trade is at its height in November. It is in one sense an advantage that low water and ice should occur together, but it makes the stoppage of traffic all the more complete.

The next important difficulty is the swiftness of the current. This, in certain sections of the stream, is an ever-present danger and difficulty, and so far every attempt at regulating the course of the navigable Danube has only increased the difficulty. Wherever the river traverses rocks that resist erosion, as, for instance, along the edge of the Bohemian massif or through the Banat block, the valley tends to narrow to a gorge, and with the narrowing of the watercourse the velocity necessarily increases. Between Wellenburg and Kelheim, where the velocity of the stream has been increased partly by the building of a mole, iron rings have been inserted in the river wall to enable the boatmen to drag their boats upstream.

It is not till Passau is reached that the Danube becomes a great river. The Inn pours in its voluminous and turbulent waters, all milky with sediment from the Alps, and the smaller Ilz adds its inky quota from the peat moors of the Böhmerwald, so that the tawny Danube waters flow in sharp contrast between those of its two tributaries. Passau lies on a tapering ridge of rock between the two rivers, of which the Inn is distinctly the more important so far as the volume of water is concerned.

The river port, however, lies on the Danube and not on the Inn, for that river is far too rapid to be navigable for anything but a canoe; apart from which, at very high water it would be impossible for the barges to pass under the bridge. When the officers of the Inter-Allied Commission made a state journey up the river in March 1920, it was necessary to dismantle the captain's bridge to allow their boat to pass under the bridge at Deggendorf above Passau. The passenger boats leave the quay at Passau stern foremost to proceed downstream, and so continue, until the swirling commotion of the Inn confluence is safely passed and the negotiation of the Danube bridges has been accomplished. At Schlegen the river swings round about five-sixths of a circle. The castle of Hatchenbach, built on the high, knife-like ridge that forms the neck of the peninsula, appears in view for a brief moment and then the little steamer swings round the great curve, heeling right over, and in another minute or so the back of the same castle looks down on one

from the ridge. Of course every section of the river has its own skilled pilots, who know every inch of the route, so that there is very little actual danger to life and property, although extreme care is needed ; but what never seems to be sufficiently emphasised is the tremendous hindrance to upstream traffic that the swiftness of the current entails. It takes on an average three times as long to come upstream as it does to go down, and though *time*, east of the German frontier, appears to have little value, the cost of fuel is great. Where the swiftness of the current makes itself most seriously felt as an obstacle to navigation is in that section known generally as the Iron Gate. A good deal of misconception prevails as regards the real nature of this obstacle, which separates the middle and lower Danube water-routes. There are really two obstacles. First there are the V-shaped twin gorges of the Klissura with their sheer

FIG. 1.—View of the Kazan—the narrowest part of the defile.

rocky walls rising from the water on either hand. Incidentally the *Times* Atlas gives a wholly false idea of this extraordinary defile, the contouring and layering giving the impression of a broad flat-bottomed trench. In passing through the Kazan proper, the narrowest part of the defile (Fig. 1), the steamer seems to fill the whole gap, and the current is tremendous. There is a special type of cataract tug with powerful engines that navigates this section. Here and there within the defile rocks come near to the surface, forming cataracts. Regulation has taken place here, and the channel is carefully buoyed, and sometimes protected by a mole. At one place, where the famous Greben rock jutted out into mid-stream, half the promontory has been blasted away.

This gorge, or series of gorges, with its narrows and cataracts, is *not* the Iron Gate proper, as many people imagine. The Iron Gate is an obstruction formed of a great reef of rock which formerly stretched almost entirely across the river just below Oršova. A narrow channel

two and a half kilometres long has been blasted through this reef, and the long mole which shut out the river during operations still separates the narrow channel from the broad stretch of rapids. The water was very low in August 1922, when the writer made the journey through the Gate, and the reefs were jutting out right across the river, except, of course, in the excavated channel. At very high water boats need not use the channel.

The comparative narrowness of the channel is, in itself, an obstacle to navigation; it is not safe for vessels to attempt to pass one another either here or in the gorges above; they have to be signalled through the various sections of narrows, and much delay naturally results. But the most serious effect of the narrowness of the channel is the enormous increase in the velocity of the current. It takes a vessel only about five minutes to pass the Iron Gate downstream, but at least half an hour under full steam for it to fight its way up against the current, and a 1200 h.p. tug, with one fully loaded barge, is said to take over an hour. During the War the Germans constructed a railway on the bank, with a powerful locomotive to tug the barges through the Iron Gate. They put it out of action in their retreat, and the Allied Commission which has organised the Danube traffic since the Armistice did not consider it worth while to repair it, as the difficulties of steering with a diagonal towing apparatus were found to be very great. The very powerful chain tug, the *Vaskapu*, does good service here, however. She can manage to tow two barges at a time through the Gate, whereas the ordinary cataract tug can only manage one, and has to repeat the journey for each member of her convoy.

One has frequently heard and seen it stated that a new *canal* has been cut to avoid the Iron Gate. This, of course, is not so, and as far as one can see, is never likely to be. The mistake has probably arisen from the mistranslation of the German word *Kanal* by canal instead of *channel* in the English edition of Partsch's *Central Europe*.

The seriousness of the double obstacle of the Iron Gate and the Kazan to the development of Danube transport cannot be overestimated. It lies between the two great grain-producing regions of south-eastern Europe—the Lower Danube and the Hungarian plains—and forms a complete barrier to any development of Black Sea traffic above Turnu Severin on the Roumanian frontier. Below that place there is no serious obstacle to shipping except the ice, and it is held that the maintenance of a three-metre channel above and below the Banat would be a comparatively easy matter, upstream as far as Vienna, or at least Bratislava, and downstream to the mouth at Sulina. Nothing, however, appears to be possible in alleviation of the difficulties at the Iron Gate and the gorges above it but the canalising of the whole section and the construction of an elaborate series of locks—a large and costly undertaking. It is true that a scheme has been considered which involved carrying a canal through a tunnel to be driven through the corner of upland round which the river winds between the Juč Rapids

and Brza-Palanka. This scheme was, however, abandoned as being too costly and uncertain an experiment. Some of the more obvious difficulties involved can be appreciated by a study of the accompanying sketch-map (Fig. 2).

There are other factors, related to economic and political geography rather than to physiography, that are vitally concerned in the develop-

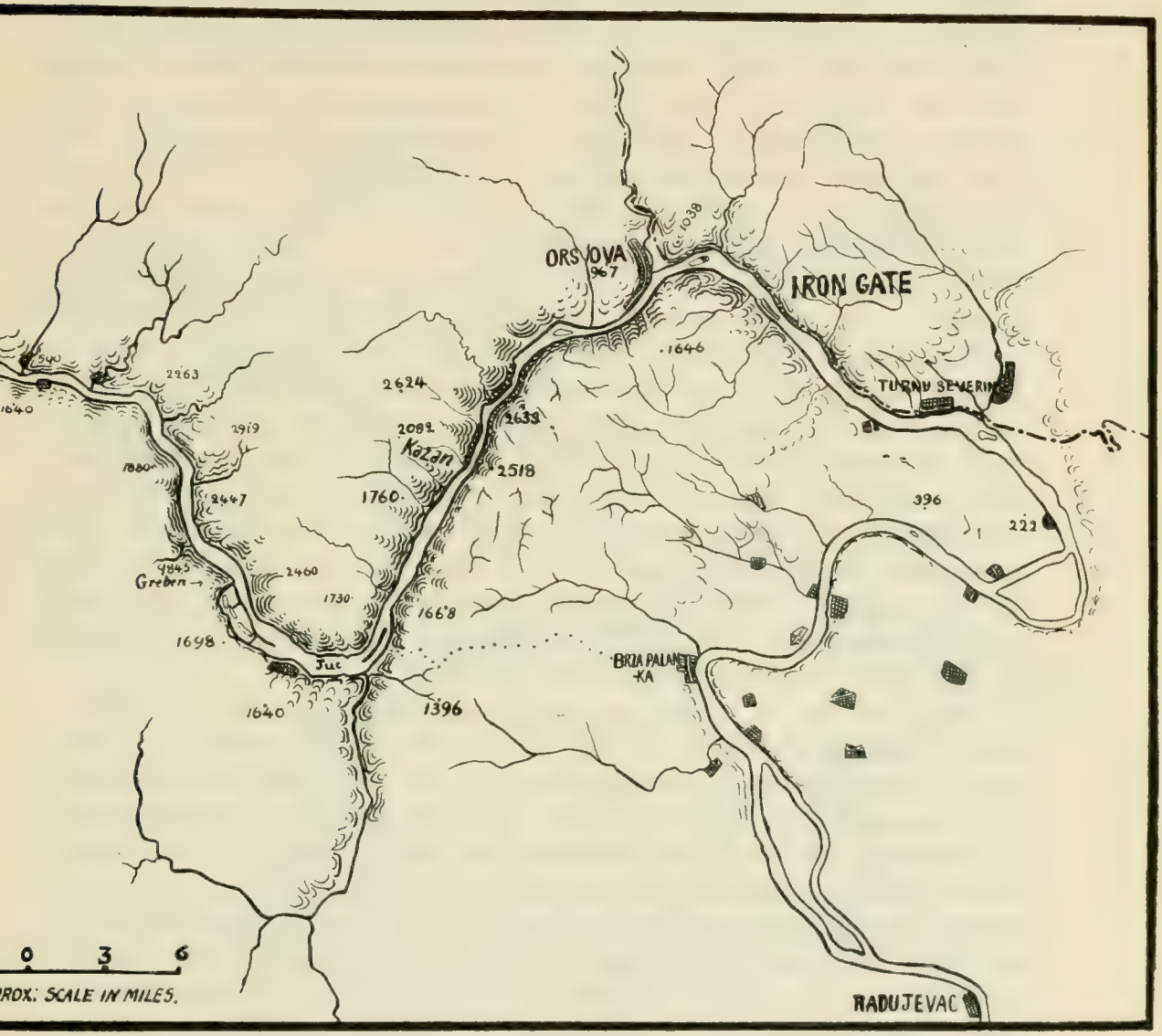

FIG. 2.—The Cataract Section of the Danube Navigation, showing the gorges and the narrows of the Kazan with the Iron Gate obstruction below the gorges. (Heights shown in feet.)

ment of the Danube as a waterway. One of these has been the lack of co-ordination in the regulating of the river and the organising of its shipping on the part of the riparian states, and this has not been completely overcome by the internationalising of the waterway. The delays, difficulties, and sometimes discourtesies that the traveller encounters at frontier stations make one realise that common sense and good-will are necessary if Danube traffic is to prosper. One hopes that, given a satisfactory settlement of the Near Eastern problem, common sense,

whilst is perhaps another name for social sense, will prevail; but the economic problem will remain and will tax to the utmost the ingenuity and resource of the Danube Commissioners and the states involved. The difficulty is this: the industrially developed regions opening to the Danube lie upstream; the agricultural regions producing a surplus food supply lie downstream. In other words, the heavy bulk goods that can ill bear the expense of slow and costly transit have to struggle upstream against the current, whilst the manufactured goods that can better bear the cost of transport get the benefit of the motive power and the saving in time afforded by the current. Passenger boats plying in the cataract and Iron Gate section carry passengers at half fare upstream, although it costs more, in order to induce them to make the tedious return journey by boat. Before the War it was cheaper to send Roumanian wheat downstream and via the Black Sea and the Mediterranean to Hamburg than to send it via the Danube into Bavaria! It is here that the question of competition comes in. The traffic on the lower Danube, before the War, was carried on mainly in British vessels (although an important number of Greek vessels took part in it also). The Mediterranean route was able to compete successfully with the Danube route upstream because the British vessels brought with them bulk cargoes of British coal as well as iron and steel goods to exchange for the grain that they received from the Danube States; and one cannot help thinking that even if the difficulties at the Iron Gate are eventually overcome the main effect will be to increase the traffic, not upstream from Roumania to Bavaria, but downstream from Hungary to the Black Sea and Mediterranean.

One does not, of course, wish to give the impression that the Danube has no value as a waterway. One can see the quays at Passau or Vienna piled up with mangles, reaping machines, rails, and other hardware ready for transport downstream to Belgrade or beyond. One encounters a few timber rafts with their enormous controlling oars. Timber is also loaded on to barges and travels both up and down stream—pine comes down from Bavaria and Tyrol and oak goes up from Bosnia and Serbia. Oil tank barges move upstream and grain from Hungary goes up as far as Passau, where most of it goes on to the railway for further distribution. The commercial development of Passau was almost entirely a result of bringing the railway there. It is interesting to note that there is no town of modern industrial or commercial importance on the Danube which has not important railway communications—Ratisbon, Passau, Linz with its enormous station, Vienna, Bratislava, Buda, Belgrade, Novisad and so on. Belgrade especially is anxious to extend her railway facilities and to open up routes to the Adriatic where she has visions of a great port at Cattaro. She seems to be more interested in that than in the development of Danube traffic, and this in spite of the fact that her obvious natural outlet is to the north and north-west, and the difficulties of railway communication with Trieste and Fiume, let alone that across the mountain mass which shuts her off from the

Adriatic further south, are but too patent to any but the blindest optimist. (The Salonika outlet may prove a more useful alternative, however.)

One cannot help thinking that the value of the Danube as a waterway will continue to be confined to certain definite reaches connected with special railway collecting and distributing centres, and that its value as a transcontinental waterway is problematical, to say the least of it. One is aware that this is not a fashionable doctrine. Long before the War the Germans were becoming enthusiastic about their great

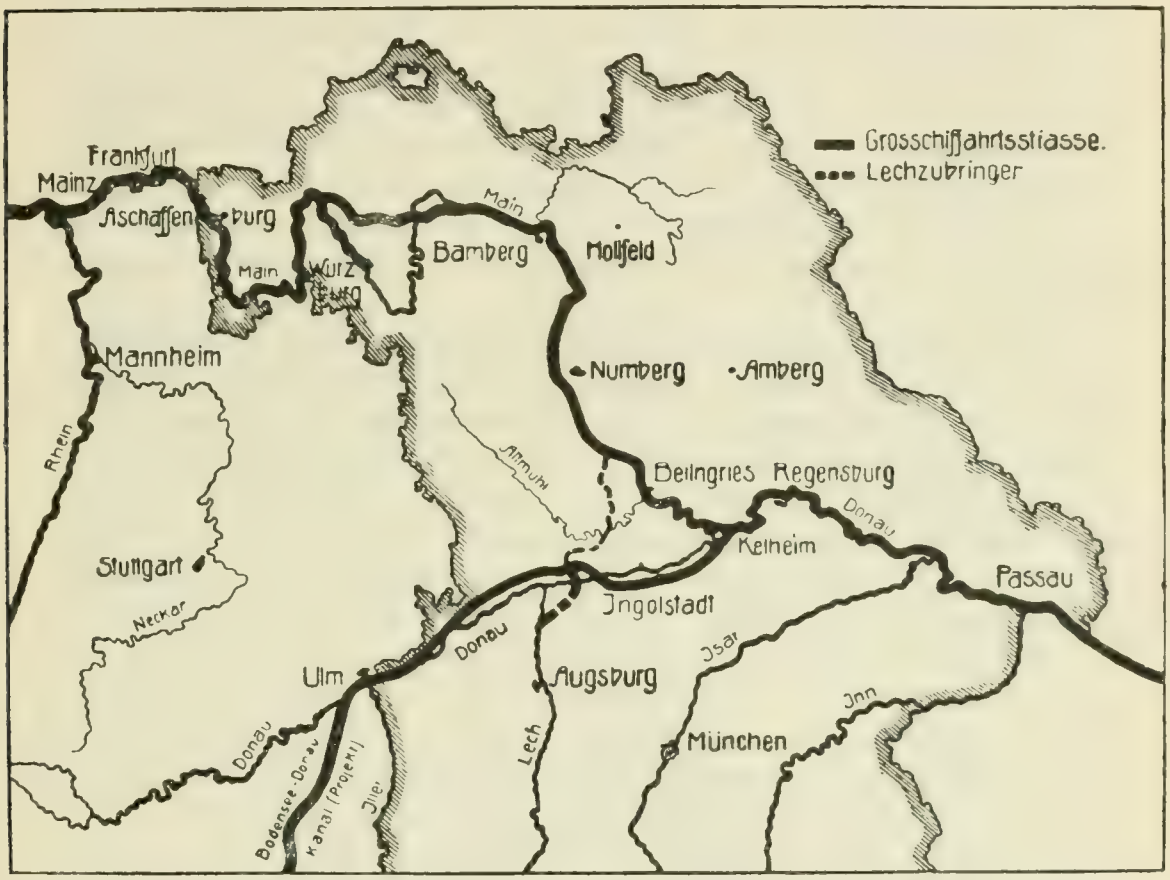

FIG. 3.—Sketch showing the projected Rhein-Main-Donau canal scheme. The canalisation of the Main is complete to Aschaffenburg.

waterway schemes that were to link the Rhine with the Vistula and the Danube, and during the first part of the War the German Press waxed quite hysterical about the Rhein-Main-Donau scheme which has come to the fore again recently. This through canal scheme was an important factor in their "Drang nach Osten" project, and there is little doubt that in time of war such transcontinental waterways might be invaluable to a central power. There was also the avowed intention of cutting out the British grain and coal traffic in the Mediterranean and Black Sea. But, with all due respect to enthusiastic journalists of our own Press who have found useful copy in the propaganda literature of the companies anxious to raise capital for these undertakings, who wants

to send goods by river and canal from the Black Sea to the North Sea? And how is the linking of the Rhine and Danube going to prove the salvation of Europe? If lines of communication could accomplish this the railways would have done it long ago.

One does not, of course, mean that improvement schemes for the European waterways, if satisfactorily carried out under international control, might not be of great service to Europe as a whole and to individual countries in particular. In any case they would be a means, if a costly one, of keeping down railway freights. Moreover, the cost of these undertakings could doubtless to some extent be defrayed by the production of hydraulic power, which forms an important part of most of the projects. The Rhein Main Donau scheme, the main lines of which are shown on the accompanying plan (Fig. 3), includes such power stations. An Oder Danube canal that would cheapen the transport of Silesian coal to Austria, Czecho Slovakia, and the Balkan States might be of very great service, but the geographer has to beware of accepting at its face value the evidence of literature that is published for the purpose of raising capital.

Whatever improvements are made in the future, and no doubt there will be many and important ones, the Danube, which in point of length, breadth, volume of water and beauty of scenery far surpasses the Rhine, and whose physical disadvantages of current, rapids, rocks, narrows, shoals, and even ice are not so very much more serious than those of that river, has the fatal disadvantage that it flows from west to east instead of from east to west—and no amount of engineering is going to cancel that geographical fact.

A LAND OF MAÑANA.[1]

(With Illustrations.)

In the interior of the South American continent, on the lofty plateau of the Andes, lies the republic whose very existence Queen Victoria is said to have desired to ignore,—"So far as England is concerned, Bolivia no longer exists."[2] Yet this highland country is once again claiming the serious attention of British people.

By treaties following Bolivia's unsuccessful war against Chile (1879-1883) the highland republic lost her access to the Pacific and became dependent for outlets upon the grace of the conqueror. Although her

[1] A. *Three Years in Bolivia.* By L. Portman. London: Grant Richards, Ltd., 1922. Price 15s.

B. *Six Years in Bolivia.* By A. V. L. Guise. London: T. Fisher Unwin, Ltd., 1922. Price 21s. net.

C. *Silent Highways of the Jungle.* By G. M. Dyott, F.R.G.S. London: Chapman and Dodd, Ltd., 1922. Price 25s. net.

[2] B, p. 68.

frontiers with Paraguay are not even yet delimited, and those with Chile, Brazil, and Peru have been settled only within the last twenty years, Bolivia has enjoyed independence as long as her neighbours.

With true Hispano-American dilatoriness things are left to move in their own time in this wonderful land, and what cannot be done to-day may be done to-morrow, or some time, or never. Hence statistical and other official information is woefully lacking.

Bolivia is probably six or seven times as large as Great Britain, but with an undrawn eastern boundary, who can say ; its population may be a million and a half or three millions, but census-taking is a tiring occupation, and after all it can wait. Estimates point to over half of the people being Indians, another quarter of mixed race, an eighth may be whites, there are a few negroes, and the remainder are unclassified. All who can read and write possess the suffrage and elect directly their president and congress of two chambers. About 13 per cent. of the total population have such a qualification, and if the electors exercise their high privilege as fully as we do, an election will not be so exciting as an earthquake.

Superficially, Bolivia consists of the high Andean Plateau and the *Montaña* [1] or eastern mountain slopes. In the north the plateau is known as the *Puna* ; its elevation near Lake Titicaca is about 12,650 feet, but in the south about 1000 feet less. Many peaks rise to over 20,000 feet. Perhaps the best known of these are Sorata and Illimani (see illustration), each over 21,000 feet. Generally the plateau is bleak and inhospitable ; in the south arid and barren.

Three-fifths of the total area is included in the *Montaña*, or slope-lands of the east, where the country descends to the plains of the Amazon and Paraguay rivers. Much of the latter plain is *llano* country ; the Amazon region is forested. In this part some five millions of acres are more or less primitively cultivated for local food supplies. This, too, is the land of the coffee and coca trees. Of the latter Mr. Guise says (B, pp. 35-7), "To the Indian there are two things, for the attainment of which all else is only the means—coca and alcohol. The one enables him to endure hunger, thirst, and fatigue, and the consumption of the other is for what *fiestas* were invented. In a small pouch, cunningly woven, which every Indian carries tucked in his belt, he keeps his precious coca leaves. These leaves, which are the same as those from which cocaine is extracted, grow on a shrub cultivated in the warm valleys of Bolivia and Peru, where they are carefully picked, dried, and dispatched for sale to the Indian of the *Puna* (highlands), who chews them incessantly. One by one he puts them into his mouth, carefully stripping each leaf of its stem before doing so. From time to time

[1] "*Montaña*, in Peru at least, is a term indiscriminately applied to any section of this (eastern) country, irrespective of whether it is high up on the eastern slope of the Great Andean chain, where the forests begin, or away down in the low-lying Amazon basin, where the same forests continue to stretch in an unbroken sea of green several thousands of miles to the Atlantic sea-board" (C, p. 67).

during this operation he bites off a small bit of a grey substance resem-

La Paz, with Monte Illimani in the background
(From *Three Asses in Bolivia.*)

bling tailors' chalk, called *lejia*, composed of boiled potatoes ground into a paste with wood ash, dried, and made into little flat cakes. The *lejia*

is to enhance the flavour and effect of the coca. When the Indian has sufficient leaves in his mouth he chews them into a wad, which he puts into the pouch of his cheek, monkey fashion, and there it remains until he can afford the luxury of a fresh chew.

"Coca chewing is so much a part of the Indian's daily life that in mines there are intervals of fifteen minutes each—at ten o'clock and three o'clock—when all hands cease work in order to renew their wads of leaves. The coca pouched during an *acculle*, as this interval is called, is, of course, additional to the early morning, mid-day, and evening rations. Even the children, boys and girls alike, acquire the coca habit at an early age, and are as assiduous devotees to the leaf as their parents. Several of my peons used as much as two pounds of dried coca leaves per week, although the average consumption was half that amount. The one article of which the mine's *pulperia* (store) might never be out of stock was coca. Other necessities, such as rice, flour, or sugar, might fail owing to difficulties in obtaining transport for fresh supplies from Oruro, and, apart from a little grumbling, the peons would give no trouble. But their bi-weekly supply of coca stopped, work would have likewise ceased. No coca, no work!

"For coca the Indian will do anything. He will refuse to render a service for money, but a pinch of coca leaves will buy his eager compliance and transform surliness into cringing servility."

Mr. Guise's journey took him down the valley of the Rio Beni, a tributary of the Madeira, where rubber is described as the life of the region. The market town is Rurrenabaque, to which goods are sent on rafts manned by Leco Indians, about whom the author has much to say (B, pp. 136-7). On the other hand, Mr. Dyott lays little stress on the rubber industry. "One might well ask what the future of the Upper Amazon is to be. Unless oil, of which I saw many indications, renews interest in this part of the world, large sections may revert to savagery, as for instance in the Upper Napo, where already the rubber-gatherers have withdrawn and the Indian tribes who once occupied the territory have returned to their original haunts" (C, p. 140).

While the plateau drains naturally to the Madeira tributary of the Amazon by such rivers as the Marmoré and Beni, or to the Paraguay by the Pilcomayo, there is also an internal drainage basin in the *alta-planicie* or high plateau. The sluggish Desaguadero carries the overflow of Lake Titicaca through Lake Aullagas or Poopo to the salt swamps some sixty miles west.

Bolivia is situated entirely within the tropics, but the climate shows all gradations, from the tropical lowlands to the arctic colds of the snow-capped peaks. The prevalent trade-winds bring rain to the *Montaña*, but the plateau suffers from drought.

In rising to the altitudes of the plateau, and on the plateau itself, the traveller may suffer from reduced atmospheric pressures. He may experience "intense headache, vomiting, blueness of the lips and fingers, respiratory distress, and great prostration, sometimes leading to uncon-

sciousness" [1]—the symptoms of mountain sickness or *soroche*. Its effects are in part due to a rapid rise in altitude, so that travellers are recommended to break the journey from sea-level to the rarefied atmosphere of the Bolivian plateau (B, p. 16), but even those who have previously lived on the plateau are not immune from attack.

Mr. Portman's volume deals, so far as Bolivia is concerned, with the mineral wealth of the plateau. His aim was "to inspect and acquire options on ore bearing properties." He approached the country from the Argentine *via* Jujuy, and his description of the journey is so lightly written and so racy that we lose sight of its difficulties in our enjoyment of his spirit. His centre was Oruro, and his account of the fortnight he and his companion "asses" spent in the town is merry reading. Mining methods are antiquated. At the mines close to Oruro "we wandered about just as we pleased, no one seeming to care whether we were there or not, no one, indeed, appearing to be in charge; and we were able at our leisure to inspect the venerable contrivances which there did duty for 'plant.' We beheld an ancient steam-engine, for example, whose function it was with infinite slowness to haul up ore from the depths of the mine, and whose fuel was that which a llama had done with. We beheld rows of women sitting on the ground and sorting by hand the ore brought to them from the mine. We beheld apparatus that in Europe would long ago have been treasured by a museum. On every side we beheld litter and waste" (A, p. 154).

Mr. Portman, whose keen sense of humour does not blind him to the conditions around him, has recorded his views on the sanitation and death-rate of the town of Oruro, 12,000 feet above the sea:—"The inhabitants retire to this cemetery far more frequently, and at an earlier age, than we should approve of in England—the death-rate must be very high—but not more frequently, it must be owned, than they deserve to. For sanitation is not the strong point of Oruro; nor, in view of the natives' ideas on that subject, would any attempt at improving it be of the faintest use; they just do as seems good to them. There is as a result a great deal of typhoid always present—and frequently epidemic. Pneumonia carries off immense numbers of natives; the cold (in winter), the rarefied atmosphere, and the extra work placed on the heart by the altitude making it a very dangerous enemy. Enteric and dysentery also take their toll. And though Europeans with their stronger constitutions and cleaner habits stand the conditions better than the natives, they too have far more illness and death among them than they would at home. For my part, I am not ashamed to confess that I always drenched my handkerchief in scent before I went out: and so by breaking the edge of the attack believe that I saved myself from unthinkable penalties of disease" (A, pp. 134-5).

Three Asses in Bolivia will rank with the best humorous travel books; its interest is steadily maintained, and if the author has little love

[1] "Effects of High Altitudes on the Human Organism": report of a lecture by Professor Meakins in *Scotsman*, 2nd February 1923.

of scenery as such, he has a happy knack of poking fun even in the most depressing circumstances. It is hopeless to quote in order to prove this,

River Scene in the Foothills of the Andes.
(From *Silent Highways of the Jungle.*)

but when the reader has crossed the Transandine Railway to Buenos Aires and realises that the end of the journey is in sight, he feels inclined to turn back to laugh with the author once again.

Mr. Guise approached Bolivia from the Peruvian port of Mollendo and Lake Titicaca, whence he made his way to La Paz, the largest town and unofficial capital of Bolivia. The official capital is Sucré. His

interest, too, was in mining; he describes himself as a "young mining engineer recently appointed to the post of assistant manager of a tin mine in Bolivia." Having spent a longer time in the country, the author can give us a fuller account of the natives and their customs. After a couple of years at tin mining Mr. Guise entered the service of an English company recently formed to exploit a gold-dredging concession on the Kaha tributary of the Beni. Thus the greater part of his story—the transport and building of a Clyde-built steel dredger—deals with the *Montaña* country. He, too, has a keen sense of humour, not boisterous but quietly effective; and he possesses a love of nature's wonders. His description of the creatures of the jungle (B, chap. xii.) is excellently done, and helps us to follow the greater sufferings of the author of our third volume.

Mr. Dyott's journey, undertaken "with a view to ascertaining the feasibility of aerial transport" in the Upper Amazon basin, is a most remarkable one. It is true it does not concern itself with Bolivia, but it deals almost entirely with the *Montaña* of Peru, and especially with the valley of the Upper Marañon or Amazon, and hence may be noticed here. His line of travel across the cordilleras to the Huallaga and Iquitos on the Amazon was a strenuous and adventurous one, but the middle portion of the return journey reads like a romance. When, after surmounting the rapids of the Marañon at the Pongo de Manseriche, he was left in the forest to die, his presence of mind did not forsake him, though he lays bare his soul as the insects and thorns lacerated his body (C, pp. 258-9).

The pages that follow this passage, including chaps. xiii. and xiv., are more wonderful than any novelist could pen. They include the story of the author's life among the Aguaruna Indians and his ultimate escape from a virtual yet gentle imprisonment. It would spoil the story to quote from it; let the reader listen to Mr. Dyott, who is an excellent narrator.

To those who would visit the Bolivian *Puna* and the Peruvian *Montaña* in good company at their own firesides we recommend these three companions. Each has supplied a map, each has a story to tell, and the three stories supplement one another. It would hardly be too much to say that there is not a dull page, and it may be declared, on soul and conscience, that each is a boon companion, so far, at least, as his writing lets us see his mind.

"For those who have anything to do with Latin-American countries the greatest of all virtues necessary is patience—of the vices, the most essential is a complete indifference to time. Without one of these life becomes positively unbearable, as it is immaterial to the average native whether a thing is done to-day, to-morrow, or not at all" (C, p. 27). In this sense Bolivia is a land of *mañana*, but so also it is a land of to-morrow in that, as the country is being opened up by railways and motor roads, its natural resources must sooner or later be fully developed (A, pp. 156 s; B, pp. 242-3). J. H. B.

GEOGRAPHICAL NOTES.

America.

Wind and Soil Transport.—In *Science* for 8th September last there appears a short note on the effect of wind on agricultural soils in the Connecticut Valley in the vicinity of Amherst. The valley is floored by soils varying from sands to clays, and is open to the uninterrupted sweep of the prevailing north-westerly winds. In a storm which lasted for three days in April 1922 sand drifts of three inches deep were observed on the south side of barns, and onion seeds were blown out of the soil. Any form of close vegetation acts as an effective check, and thus spring, when the land is being prepared for crops, is the most dangerous period from the farmer's point of view. Again, the storm must be of two or more days' duration before erosion is marked, for the first day is usually required to dry the soil. The coarser soils are more liable to erosion than the finer silts and clays, for the latter are usually covered with vegetation.

Polar.

The South Orkney Observatory.—Mr. R. C. Mossman sends us the following note from Buenos Aires: "It is of interest to note that the meteorological and magnetic observatory established on Laurie Island, South Orkneys, twenty years ago by the late Dr. Bruce is still maintained by the Argentine Meteorological Office. The observations, since their initiation on 25th March 1903, continue to be made hourly by night as well as by day, and a new Commission is sent down to the island every summer to relieve the party installed during the previous year. Since the station was taken over by the Argentine Government in February 1904 the annual reliefs, with one or two exceptions, have been made by the gunboat *Uruguay*, but the new Minister of Marine has decided to acquire a suitable polar ship with adequate ice protection, as on several occasions the *Uruguay* has been in extreme peril among the pack, and has now been definitely withdrawn from the voyage. The Commission for the current year left Buenos Aires on 29th January on board the transport *Guardia Nacional*, which will convey the party to Grytvillen King Edward Cove, South Georgia, whence a small whaler belonging to the Argentine Whale Fishing Company will continue the voyage to the South Orkneys, the transport awaiting the arrival of the returning party. The chief of the 1923 Commission is Señor Hugo Valentiner, who has already spent over three years on Laurie Island, having been in charge of operations during the years 1917, 1919, and 1921."

Economic Geography.

A Suggested Economic Use for Opuntia.—It is a familiar fact to geographers that the Prickly Pear or Opuntia, a member of a very large

American genus of the Cactus family, has spread very widely over arid and semi-arid areas in the Old World. It is now an exceedingly common plant, in suitable areas, everywhere round the shores of the Mediterranean Sea, but in South Africa and in parts of Australia, especially Queensland and New South Wales, where large tracts of land suitable to its needs occur, it has become an agricultural pest of the first importance. The rapidity of its spread, and the fact that land seriously infested becomes practically useless to the farmer, have led to sustained efforts being made to eradicate it. The result, however, as in the case of some animal pests, has been far from commensurate with the efforts expended. As against the injury which it does to agricultural land, there has to be said in its favour only the fact that it can be used as a hedge plant, and that, in favourable climates, it yields an abundant crop of fruit, the prickly pears, called Indian figs in the Mediterranean area. These fruits have a fairly high sugar content, but have little market value as fruit, more especially since the lands suitable to the cactus are also suitable to many kinds of better fruit. The fruits are eaten to a small extent in the Mediterranean area, and are said to be prized, chiefly presumably on account of their abundance, by the native peoples of South Africa.

According, however, to an article in the *Times* Trade Supplement for December 9, a Free State farmer has recently devised a commercially feasible method of utilising the sugar content as a source of power alcohol. The suggestion has been made before, and attempts have been made in the United States to manufacture power alcohol from the fruit, but not, it would appear, on a commercial scale, or with any prospect of real success. Apart from the actual method adopted, which is said to be new, there are certain factors which seem to indicate that the scheme has some special prospects of success in South Africa.

The first of these is the enormous area, said to be no less than 2,000,000 acres, of fertile land lying fallow in the Union owing to infestation by the pest, and the great amount of fruit produced, said to be about ten tons per acre. Then the presence of a large native population, accustomed to the gathering of the fruit, is an important point. Finally, and in some ways most important of all, the market exists within the country itself. South Africa has suffered greatly from the high price and scarcity of petrol in the post-war period, and for some years a power alcohol called Natalite, derived from the molasses produced in the sugar-refining industry of Natal, has been used. But the amount available is small, and cannot be greatly increased. Attempts have also been made to produce fuel alcohol from maize, but the difficulty is that maize is a plant which requires cultivation, and is of much value in South Africa as food. The cactus requires no cultivation, and has little value as food. If it can be used anywhere for alcohol production on an economic basis, therefore, the conditions in South Africa appear exceptionally favourable, and it is possible that Australia might also adopt the new South African method.

The Society's Library.—Members are aware of the fact that the Royal Scottish Geographical Society was founded in October 1884, and that one of its great objects was the establishment of a library. It is recorded in the first Report of Council, drawn up in October 1885, that as the result of a year's work the library catalogue contained 2810 items, of which 800 were books in the strict sense. Of that 800 no less than 629 had been presented and only 171 purchased. Since this time presentations, both from publishers and private donors, have played a very important part in the steady increase which has taken place. This fact encourages the Hon. Librarian to make an appeal to members to help to fill up certain gaps, which result necessarily from the way in which the library has been built up. For example, it has been found possible to subscribe continuously for the publications of the Hakluyt Society. But the cost of purchasing the volumes issued before the founding of our Society is prohibitive, and thus almost all prior to the year 1883 are missing from the library. This is the more to be regretted as it does not appear that any complete set is to be found in Edinburgh in a library available to the general public, as is our library. Any one of the missing volumes, therefore, or any contribution towards the purchase of these, would be very gratefully received by the Hon. Librarian. Other notable defects of the library are that such books as *The New Statistical Account of Scotland* and the new edition of the *Encyclopædia Britannica*, which would naturally be expected by readers, are both absent and funds do not at present permit of their purchase.

General.

The Earth's Crust and Isostasy.—Dr. William Bowie, of the United States Coast and Geodetic Survey, contributes a most instructive article on this subject to the October issue of the *Geographical Review*. The article opens with a short historical sketch, ending in the following summary of conclusions which rise out of recent work :—(1) The earth's crust is in a state of practically perfect isostatic equilibrium. (2) The depth to which isostatic compensation extends is not known, nor has the manner in which it is distributed been determined. (3) But if it is assumed that the compensation is uniform with respect to depth, and complete within a certain depth, then the most probable limiting depth is about sixty miles. (4) It is not known whether isostatic compensation is directly under a topographic feature to the extent that single mountain peaks are compensated within the column directly under them. (5) But it is probable that the compensation of such features is not distributed horizontally to distances as great as one hundred miles from the feature. (6) The isostatic compensation of topographic features is so complete that the deflections of the vertical are only approximately ten per cent. of what they would be if the land masses were excess loads on the earth's crust. Gravity anomalies—that is, the difference between the observed and the computed values for the intensity of gravity—are on an

average not more than fifteen per cent. as large at stations at high elevations, as they would be on the theory that the earth's crust is rigid.

The remainder of the paper is devoted to a discussion of some more speculative points, and is illustrated by some clear and instructive diagrams.

These diagrams are based on the conception that the earth's crust, or isostatic shell, consists of a series of unit columns. Each column has the same cross-section at its base, and the same mass, but they differ in volume and density; for one bearing a mountain mass is obviously longer than one covered by the ocean or by a coastal plain. Now the isostatic shell must possess a measure of rigidity, otherwise surface creep would occur, and the continents would overflow the sea floor. But the rigidity is not great enough to withstand vertical stresses. This is obvious when we consider that surface erosion removes matter from the mountain areas and deposits it as sediment on the lower grounds. Since areas of erosion and of sedimentation remain in isostatic equilibrium despite the transference of matter, compensation is clearly taking place, and Dr. Bowie argues that this compensation takes place as a deep-seated flow. Thus if we consider two neighbouring unit columns, one (A) having at its surface an area of erosion, and the other (B) an area of sedimentation, then as matter is transferred from the surface of A to that of B, so also matter is transferred from the base of the column B to that of the base of A. Thus B is to be regarded as a sinking area and A as a rising one. But the material which flows from the base of B to that of A is necessarily denser than that which is transferred at the surface from A to B, and Dr. Bowie estimated that this difference in density is as much as ten per cent. That is, if 100 feet on an average is eroded from an area, the disc of material brought into the column at its base would be 90 feet in thickness, and the average elevation of the area would be lowered by 10 feet only. Thus if 1000 feet of material is eroded at the surface the average elevation of the mountain mass would be lowered only by 100 feet, and to reduce a mountain system of 5000 feet elevation to sea-level, 50,000 feet must be eroded from its surface. This means a continued uplift of the material of a mountain, and in the author's opinion accounts for the exposure of the igneous core, as in the Alps and the Rocky Mountains. It will be noted that this conception involves the notion that the elevation of mountain chains is due to vertical uplift, not to horizontal forces. As to the cause of the uplift—that is, of the original greater volume of A as compared with B—the author lays stress upon the fact that below an area of sedimentation each portion of the unit column of which it forms a part is being depressed into hotter parts of the earth's crust. Similarly, below an area of erosion each portion is being raised to colder regions. Dr. Bowie believes that ultimately in the one case expansion of material occurs, and in the other contraction. He thus arrives at the conception of a constantly repeated swing between areas of sedimentation and areas of erosion. In a particular area copious sedimentation occurs, leading, by the mechanism already described, to heating of the

subjacent layers. After sedimentation has ceased, and possibly after a long period of quiescence, expansion takes place, resulting in uplift. The region then becomes an area of erosion, and is ultimately reduced to base level. With the cessation of erosion from this cause, the material in the isostatic column, which has been brought up to colder regions of the crust, cools and contracts, resulting in subsidence. Sedimentation then occurs once again and the process is repeated. The suggestion is made that certain parts of the crust have been "active regions" in this way throughout geological time, while other areas may never have been subjected to heavy sedimentation, and thus never elevated into mountains.

NEW BOOKS.

EUROPE.

Ireland. Edited by GEORGE FLETCHER. Cambridge: University Press, 1922. 8*s.* 6*d. net.*

This volume is a general and supplementary account of Ireland to complete the series of the separate provinces already reviewed in the *Magazine.* In a compass of 290 pages the various aspects of the island are concisely dealt with by authorities. The book forms an excellent introduction to the detailed studies of the four provinces, and is valuable to those who desire to understand the present state of Ireland. The volume is illustrated with sketch-maps and photographs, has orographical and geological maps on the inside covers, and contains an adequate index.

Balkanised Europe. By PAUL SCOTT MOWRER. New York: E. P. Dutton and Co., 1921.

The author gives in this book, written in Paris during 1920, the result of eleven consecutive years of experience as a special European correspondent for the *Chicago Daily News.* By "Balkanised" he means that Eastern and South-Eastern Europe have been "broken up into a number of nominally 'national' states which are small, weak, jealous, afraid, economically dependent, a prey to intrigue, and pregnant with trouble of many descriptions, not to say wars." He was much struck with the words of a Hungarian he met in Budapest who exclaimed, "Unhappy the man who is born into the midst of this whirlpool of conflicting races! If it isn't war, it is revolution. If it isn't revolution, it is war. And yet, I could never go away. Any other life would seem dull to me now. And who knows? Perhaps out of this very clash and turmoil of peoples, some of the finest achievements of men are destined to come—in the future again, as they have in the past."

To an American like Mr. Mowrer it seemed exceedingly strange "that the fifteen or twenty odd races and remnants of races of the Balkans and Central Europe should have continued to live thus for centuries side by side, overlapping and intertwined, without losing to any appreciable extent their distinct racial characteristics. In America national absorption has been speedy and for the most part sure." The thousands of foreigners who arrive there scatter through the vast spaces of the continent and their children go to American schools and forget the language of their parents. He asks, "What makes the enormous difference between the Old World and the New?" and concludes that "the foreigners who

emigrate to America, through desire for change, or in search of better economic opportunities, have usually broken for good with their former life. Many, within a short time, have become more American than the Americans."

In the author's opinion the new states of Europe suffer from "hypersensitive independence." Not one but feels itself to be entirely surrounded by enemies. The political principle on which most of the nations seem to be acting is, "My neighbour is my enemy, but my neighbour's neighbour is my friend." Thus, Italy flirts with Hungary over the shoulder of Jugo-Slavia, and Hungary winks understandingly across Czecho-Slovakia to Poland; while Jugo-Slavia and Czecho-Slovakia, squeezing Hungary between them, sign a "defensive alliance." In the same way, Greece and Rumania, under the influence of Bulgaria's antipathy, become the warmest of friends. The Czechs sympathise with the Russians against the Poles, whom the Russians are of one mind with the Germans in desiring to crush.

Like all works written previous to a troubled and changing period, the one before us requires now several drastic corrections, especially as regards Greece. On one page the author praises the competent and well-led campaign of the Greek army in Asia Minor; on another he refers to the satisfactory economic situation of Greece. The recent triumph of Mustapha Kemal has shattered both of these assertions.

After a careful personal survey of Balkanised Europe, Mr. Mowrer is of opinion that "Bolshevism is not going to spread." In Poland the Jews may have Bolshevist sympathies, but the hatred of the Poles to Jews, and the tenets of the Roman Catholic religion to which the Poles are devoted, make Poland safe against Bolshevism. In Rumania there are only two classes, the wealthy landowners and the peasants, and the former being naturally Conservatives and the latter having received land reforms, Bolshevism is not supported. In Hungary and Austria a Bolshevist regime brought such ruin that Bolshevism is regarded with horror. Czecho-Slovakia is so rich and prosperous that Bolshevism is out of the question. Jugo-Slavia and Bulgaria are peasant democracies and disinclined to Bolshevism. Greece is "socially as sound as a bell."

In concluding his valuable and well-written book, the author devotes some chapters to the foreign policies of France, Britain, Italy, and the United States. He considers that "the key to all French action in Europe, now as before the War, is fear of Germany—a fear which is beyond any doubt fully justified," as there are sixty million Germans and only forty million French, and France may not have *next time* the help of Britain, Russia, Italy, and the United States. Turning to Britain, he says, "the striking feature of British foreign policy is its fundamental consistency." He holds, however, that Britain has two great preoccupations, the first being to restore its badly stricken commercial and financial situation as quickly as possible, and the second being the future of Russia. With regard to Italian foreign policy Mr. Mowrer remarks, "Modern Italy is old only in culture. Politically and economically, it is still very young." He holds that "broadly speaking, it seems probable that Italy is destined to fall more and more under the influence of Britain. At no point does Britain appear to block the path of future Italian expansion; indeed, it may even serve to further this expansion. Under the circumstances, a future Italo-British combination stands ready indicated." As an American, Mr. Mowrer sums up his country's foreign policy in these words, "For us the first great problem of practical politics will be that of our relations with Britain.' He continues, "Britain and the United States are to-day the two strongest powers in the world. We should remain free, in time of crisis, to act boldly with Britain, and Britain should remain free to act boldly with us, for the preservation of peace."

Copenhagen and its Environs: Handbook for Tourists. Published by the Danish Tourist Society, by XENIUS ROSTOCK (Secretary). Copenhagen: G. E. C. Gad, n. d.

This is a small paper-covered guide, with two maps, one of Denmark as a whole and one of the town of Copenhagen, and an index. It is written in very tolerable English, and will be found useful to passing travellers. There is a brief historical note upon the town in addition to the detailed descriptions of the different quarters with their streets and notable buildings.

History of Switzerland, 1499-1914. By WILHELM OECHSLI. Translated from the German by EDEN and CEDAR PAUL. Cambridge: University Press, 1922. *Price* 20*s. net.*

This is one of a series of volumes now being published under the general editorship of Sir G. W. Prothero, the aim of which is to sketch the history of Modern Europe, with that of its chief colonies and conquests, from about the end of the fifteenth century to the present time. Its author was a distinguished professor of Swiss History at the University of Zurich, who died in 1919, after his book had been completed and translated into English, but before its publication. The volume contains three political maps and a somewhat lengthy bibliography, and shows signs of much careful research and scholarship. To the geographer, however, it must prove something of a disappointment, for nothing is said of the background on which the historical drama is played, nor does the bibliography even suggest to the student that some knowledge of that background is advisable. Yet, as is indeed inevitable, constant, if indirect, allusions are made to facts which are only comprehensible if their relations to geographical conditions is understood. Thus the importance of the admission of Basel to the Swiss Confederation in 1501 is emphasised, and we are told that it "was the chief commercial entrance into Switzerland," but no explanation is offered. In the discussion of the reasons for the prosperity of the country in the Age of the Reformation mention is made of the trade "over the Swiss passes." But nothing is said of those passes nor of the trade routes, nor are the routes even marked on the maps, which give no indication of the relief features: the reader is apparently not supposed to interest himself in the interrelations between surface relief on the life of man. In short, the book is but one more indication of the fact that geographers, despite all the work they have done, have hitherto failed to convince the historians that that work is of importance in tracing cause and effect in human life.

Nights and Days on the Gipsy Trail. By IRVING BROWN. New York: Harper and Brothers, 1922. *Price* 12*s.* 6*d. net.*

After reading this book one is inclined to question the statement recently made that "Hungary is the only country where you can still get authentic gipsy music and gipsy dancing." Mr. Brown, whose blood is coloured with the gipsy strain, has studied this people in Andalusia, and, after due allowance is made for a praiseworthy and inevitable enthusiasm for everything pertaining to these wandering and picturesque folk, we are bound to assume that in Spain at least are to be found (and this is supported by many photographs and specimens of Gipsy songs) real Gipsies when one can secure admission to their recesses of mind and dwelling. The author gives us a charming account of his out-of-door wanderings on the borders of the Mediterranean under broiling suns and star-studded skies in his search for and participation in the

home life and thoughts and amusements of his kinsfolk. His descriptions are realistic, vivid, and at times poetical, the realism of his bull-fights being intense.

One sample of his quality may be given. "With its tall, white buildings crowned by lookouts, miradores, Cadiz rises from the sea, suspended between the azure gulfs of sky and water. All day its silver walls lie basking in the sun, dreaming of the cool caress of evening, when love and pleasure will stir again, and songs will float along the ocean breeze amid the tinkle of fountains in marble basins and the twang and trill of the guitar. Then she will be again the foaming Aphrodite rising with white limbs from the sea."

English Coastal Evolution. By E. M. Ward, M.A., B.Sc. Methuen and Co., Ltd. Pp. 262.

The opening sentence of a book with this title seems surprising, for it informs us that "This book makes no pretensions to be a treatise on the evolution of coast-lines." The writer has collected much material of an interesting kind relating more particularly to the southern and western coasts of England and the effect of marine erosion on the land, and has given a good bibliography of works on the subject.

But the book is not written in a style that is attractive, and indeed the writer has damaged his own case by the way he has stated it. Educated readers, who are not conveyancers accustomed to long sentences and no paragraphs, do not appreciate involved phraseology and sentences with more than a hundred words that occupy about half a page. For example, at page 72—and this is not the worst in the book—we read "Owing to an exposed position, or to lessened supplies of shingle, Northam ridge and the alluvial flats connected with it have thus already reached the stage respectively of retreat upon the main coastline and of destruction by the sea at which such features must inevitably arrive, a stage reached in this case before the shingle ridge has succeeded in entirely strangling Devon's longest rivers—aided though it is by the projection of the triangular sandhill area of Braunton Burrows towards it from the opposing coast."

At page 235 we are told that "Wave attack upon headlands creates cliffs that vary in height and steepness according to the altitude and nature of the land. A cliff coast is one from which access to the sea is as a rule difficult. There may be no path down the cliff and no beach at the base of it, and the people who live behind such a coast carry on inland activities and plough and sow their fields to the extreme edge of the cliffs, apparently unaffected by their nearness to the sea." Books with such commonplace stuff as this cannot be regarded as serious contributions to the literature on problems of coast erosion. For readers well acquainted with the places described these pages may, however, prove more interesting than the general reader is likely to find them.

ASIA.

The Making of Modern Japan. By J. H. Gubbins, C.M.G., etc. London: Seeley, Service and Co., Ltd., 1922. *Price* 21*s. net.*

As is indicated in the sub-title to his book, Mr. Gubbins, who was First Secretary of the British Embassy at Tokio, here gives a comprehensive account of the progress of Japan from early pre-feudal days up to the present time, when she may be said to have established her position as one of the Great Powers. The author, who is already known as a writer on matters Japanese, and who is a master of his subject, appears to have taken infinite pains, and his book forms a valuable contribution to the story of the evolution of the Japanese nation. It is

written with complete detachment, without any attempt at being popular in style, and is, we believe, adapted to the needs of the student of history, besides which it will form a necessary part of any good reference library.

Mr. Gubbins, in his opening chapters, deals briefly with the early history of Japan, her adoption of Chinese culture, and the establishment of feudalism and the dual monarchy in the twelfth century of our era. He also touches on the subject of the introduction of Christianity by the pioneer missionaries, of whom St. Francis Xavier was one of the first to land, in about 1549, and he points out that from then onwards until the closing of the country to all but Chinese and Dutch, it was the propagation of the Christian faith, and not the progress of trade, which was the important feature in Japan's foreign relations. How the Jesuits were ousted from their position in Japan and their faith suppressed finally in 1638, after bitter persecution of native converts, while all Europeans were expelled, except the small Dutch trading community, which was permitted to remain under humiliating conditions, interned in the island of Deshima, has been frequently told, and is familiar to all who are interested in Japanese history, but it is well to have it told afresh in Mr. Gubbins's book.

The curtain was rung up on the first act of Japan's modern foreign relations by the appearance of the American Commodore Perry with his ships in the Bay of Yedo in 1854. Perry was followed by the British in the same year, and by the Russians and the Dutch in 1855, and treaties of commerce were secured by the foreign powers. The incidents of the fifteen years which followed the date of Perry's treaty, and of the struggle for power between the Mikado's court and the Shogunate which culminated in civil war and the fall of the Shoguns, are followed with some minuteness by Mr. Gubbins, forming as they do a very important period in the island history.

Ranking next in importance in the making of modern Japan came the abolition of the feudal system, the disappearance of the *samurai*, or fighting clansmen, and the rearrangement of the then existing classes of society, which were indeed heroic measures. Mr. Gubbins points out that, under the feudal system, there had been four classes of the people—the *samurai*, the farmers, the artisans, and the traders—the traders ranking lowest, as in China, while the new order comprised only two classes—the gentry, who replaced the *samurai*, and the common people. The abolition of feudalism, he says, was the most radical of the reforms on which the new government embarked, and it cleared the way for all future progress. "It came as a boon to the peasantry. If it inflicted much hardship on the *samurai*, who formed the bulk of the military class, . . . to the farmers it was a veritable blessing. Its full significance was, however, not felt until after the lapse of several years." It was, in fact, the starting-point of Japan's modern progress, and Mr. Gubbins gives it special prominence in his earlier chapters. Japan was at an immense advantage, as time went on, in her adoption of reforms based on Western models. "At no cost to herself, without expenditure of time, thought, labour, or money, she took the fruit of generations of toil in Europe and America. She levied toll on all the Western world. Profiting at once by the discoveries and improvements made in the course of centuries in every field of human energy, she began in her career of constructive progress at the point which other countries had already reached."

Representative government followed almost as a corollary to the abolition of feudalism. By an Imperial decree of 1881 a constitution was promised for 1890. With characteristic Japanese caution and thoroughness, Prince (then Mr.) Ito was set to work to prepare the draft of a constitution, and in 1882 he set forth with a large staff on a journey to study the working of different forms of constitutional

government. On the return of Ito's mission in 1883 the framing of a constitution was taken in hand. A House of Peers was to form a leading feature, and, to this end, five hundred peers were created, while the constitution was promulgated by the Emperor in person on 11th February 1889, the date for its coming into force being fixed for November 1890. Mr. Gubbins also notes that the first parliamentary election was held in the summer of the latter year, and that the first session of the Diet took place in 1891. It is curious to learn that the constitution of Bavaria was taken as a model, small limitation being placed on the imperial prerogative, while the cabinet was responsible to the sovereign alone, and not to the Diet or Parliament. Mr. Gubbins has a very interesting chapter on the working of parliamentary government in Japan.

By this time treaty revision had become an important question, the extraterritorial privileges enjoyed by foreigners under the original treaties having for long been a thorn in the side of the sensitive Japanese statesmen. Great Britain took the initiative in this matter, and a revised treaty was signed in 1894, under which consular jurisdiction was to be abolished in five years. By 1899 the other powers had come into line, and so Japan gained a fresh stage towards equality with the Western nations.

The remarkably rapid progress which Japan had made as a naval and military power was put to the test by the war with China in 1894-95. The result of this war was a foregone conclusion, but the triumphant emergence of Japan from the war with Russia ten years later served to open the eyes of the world to what was a new situation, and it gave to Japan a strong position in international affairs, particularly in the Far East and the Pacific. The matter of the Anglo-Japanese alliance and of the services rendered by the navy of Japan during the Great War are dealt with by Mr. Gubbins, who speaks as one having authority, and the conclusion of his theme is fitly summed up by him in the following paragraph :—

"The Peace Conference which assembled in Paris in January 1919 set the seal on Japanese ambitions. The representatives of Japan took part in all important deliberations on a footing of recognised equality with those of Great Britain, France, Italy, and the United States, while, as one of the Great Powers composing the Supreme Council, Japan has had a voice in the decisions that have guided the destinies of the world."

The book is illustrated by some good photographs of leading Japanese statesmen and soldiers, the *Genro*, or Elders, so-called, who have played leading parts in "the Making of Modern Japan."

A Burmese Arcady. By Major C. M. Enriquez, Kachin Rifles. London: Seeley, Service and Co., Ltd., 1923. *Price* 21*s.*

The author quotes on the title-page from the *Encyclopædia Britannica* the statement that "Arcadia was inhabited by a hill race of shepherds and huntsmen, who worshipped Pan, Hermes, and other primitive Gods of Nature," a statement which may explain and justify the title of his book, although the country and people described in it are not such as are likely to be associated in most peoples' minds with the idea of an "Arcady." But we must give Major Enriquez the credit of having written a very interesting and in large part delightful book in spite of the fact that it is crowded with proper names of tribes, places, and districts that few people are likely to have heard of before or will want to hear about again. The charm of the book is due mainly to the personality of the author unconsciously revealed from beginning to end in the enthusiastic, generous, sympathetic, and chivalrous spirit in which it is written. The Kachins, who form the main subjects of the book, are the inhabitants of the mountainous area in the extreme north of

Burma adjoining Assam, Tibet, and China, and the author became acquainted with them during years of recruiting in the latter years of the War. He describes them as having mixed qualities and his details bear this out to the full, but on the whole he manages to present them to us in an engaging light. They at any rate made excellent soldiers in our service in Mesopotamia, showed wonderful capacity for discipline, great mental receptiveness and quickness, and, now that they have been brought into more immediate contact with civilisation, are exhibiting growing pride of race and keenness for education.

The Lhota Nagas. By J. P. Mills, I.C.S. With an Introduction and Supplementary Notes by J. H. Hutton, C.I.E., Hon. Director of Ethnography, Assam. Published by direction of the Government of Assam. London: Macmillan and Co., Ltd, 1922. *Price* 25*s.*

In this volume the Lhota Nagas are the subject of detailed observation and record, as their neighbours the Angami Nagas and the Sema Nagas were in the other two volumes recently published by Messrs. Hutton and Mills respectively. The value for anthropological students of such careful observation and record—extremely interesting record—goes without saying. To the non-technical reader, also, the Lhotas are pleasingly introduced in this volume in the Lhota song composed to celebrate the return from France of the Lhotas who served in the Naga Labour Corps during the Great War. Lhotas are expert composers of topical songs, says Mr. Mills. The song proceeds :—

"O Hutton Sahib, young man of a foreign race,
What is that letter which has come for you from abroad ?

. . . . . .

Oh, we will go to the German War,
Let not a word of the letter fall fruitless.

. . . . . .

Let our women-folk at home hear the news,
Let them hear that we have routed the enemies of the Sahib.

. . . . . .

Let them meet us with drinks of 'madhu.'
Bid them come and meet us on the road.
Tell our two Sahibs [Mr. Hutton and Mr. Mills] to send word to them,
They have given us money as countless as the grains of ash on the hearth ;

But he who gives thought to it,
Only he will keep his money."

Delightfully human document ! We had allies who "won the war for us" not only in the brave men beyond the Western Ocean but also in the Naga braves in the far east of Assam. After all, is not East West and West East ?

One of the difficulties of all anthropological study is that, slaves of ancestral custom as such secluded and primitive peoples appear to be, one is never safe to assume that any one of their social features is really ancient or pure bred : Mr. Hutton's own statement in the Introduction is that the Lhotas are of "composite origin" and that it is difficult to put forth "any test by which a Naga tribe can be distinguished from other Assam and Burma tribes which are not Nagas." The very name "Naga" is only, we are told, a foreign [Sanscritic] word signifying a *mountaineer.* Mr. Hutton himself gives instances of the present flowing tide of new customs. In one village, he says, before Mr. Mills took an "interest in Lhota

customs," the institution of the *morung* or communal *bothy* for the unmarried men and the young lads was fast dying out under Christian influence; elsewhere he found a Hindu name being applied to a Lhota Deity. Whencesoever derived, the Lhota Nagas' religious beliefs are certainly not those of the lowest human stratum, since, besides the ordinary animistic beings (the *tsandhramo's*, unnamed and undefined in function and normally malicious, we find already in their creed gods with a world of their own above the sky, a definite abode of the dead, and even a crude kind of transmigration. The section on language, generally a dry tract in such works, is here made quite interesting and suggestive. One illustration must suffice. A Lhota transitive verb seems virtually to have no subject, the subject-noun having always a suffix which is *identical* with the instrumental suffix. Thus the statement "The sahib has drunk the madhu" would be expressed in Lhota, '*By* the sahib has [been] drunk the madhu." The distinction of active and passive forms seems not yet to have emerged. In this section of the book there is generous acknowledgment of indebtedness to a Lhota grammar drawn up by a local missionary.

AFRICA.

Barotseland. By D. W. Stirke. London: John Bale, Sons, and Danielsson, Ltd., 1922. *Price* 21*s. net.*

The author has extended his notes, made during eight years' service in Barotseland, to form brief chapters of ethnical and administrative interest, the whole totalling 100 pages. Sir H. Johnston further contributes, as an introductory chapter, an interesting essay of 36 pages dealing with Barotseland generally and its dialects in particular. Mr. Stirke's work should be of use to the British South Africa Company when a handbook of the territory north of the Zambesi is compiled. As the book stands its scope is somewhat limited, as it is neither a handbook nor a close study of the country or its possibilities as might be expected from the title. The illustrations are good, but the map leaves much to be desired; also there is no index or bibliography. In view of the scope of the work the price, viz. one guinea, appears excessive. H. R. W.

The Red Book, 1922-23. Handbook and Directory for Kenya Colony and Protectorate, Uganda Protectorate, Tanganyika Territory, and Zanzibar Sultanate. Compiled by The East African Standard, Ltd. Nairobi and Mombasa: East African Standard, Ltd., 1922.

The scope of this useful book of reference has been enlarged to include the Sultanate of Zanzibar and Tanganyika Territory. There is no map, which would be a desirable adjunct to a future edition, but there is a short bibliography, including titles of both general and special books, and a general historical introduction, as well as brief accounts of the separate states included.

AMERICA.

Where the Twain Meet. By Mary Gaunt. London: John Murray, 1922. *Price* 15*s. net.*

This is a delightful book to read, but at the same time a book to ponder over and remember. "The Twain" are blacks and whites, and the place of meeting described by Mrs. Gaunt is Jamaica. The tone of the book is cheerful and hopeful in spite of some of the gruesome incidents that the author has to record. The ground for hope in the story which she has told is emphasised by the author

herself at the close of the volume, and we think she is right. "I have by no means," she truly says, "glossed over the crudities and the foolishness and the brutality of men of my own colour. But the world is changing, changing fast. It is a better place to live in in this twentieth century, it will be a better place still as the years roll on, and the black man, like the white, will come into his own." This hopefulness is encouraged by the fact that we recognise as we read that it is the same human nature that we have to deal with now as in the past, but a human nature operating in different circumstances. We can see in Africa and elsewhere at the present day the promptings that led in the past to the brutal treatment of those who were torn from their homes to be slaves and subjected as such to "foolishness" and "brutality," but the promptings are now controlled by a different public opinion. It is very natural for planters in the countries of the blacks specially to proclaim Carlyle's doctrine of the dignity of labour, but among observers on the spot it is not merely those who take their cue from Exeter Hall who point out that their interpretation of labour is labour for the white man. That kind of public opinion cannot be ignored, especially when we find it reinforced in Africa itself from another angle, when we find protests coming from the white labourers. At the Annual Conference of the South African Labour Party, recently held at Durban, the resolution "that this Conference of the Labour Party protests against the ever-increasing exploitation of low-paid skilled labour as detrimental to the existence of European standards of civilisation in South Africa" was adopted, and in the course of the discussion the president expressed the view that the industrial wing ought to be asked to consider the question of organising the coloured people to come into their union and teaching them to live up to the standards to which the Europeans aspired.

POLAR.

The Worst Journey in the World. Antarctic, 1910-13. By A. Cherry-Garrard. Panoramas, Maps, and Illustrations. 2 Vols. London: Constable and Co., Ltd. £3, 3*s. net.*

There have already been published a number of books on the last expedition of Captain Scott, but there is room for this one, although it runs into two volumes and tells of some adventures that by now are familiar to those who read polar travels. The worst journey in the world was a five-weeks' winter journey covering some 130 miles from the headquarters of the expedition at Cape Evans to Cape Crozier and back. The author is the only survivor of the three who made that journey, Dr. Wilson and Lieutenant Bowers having perished not long after on the return march from the Pole. Midwinter darkness and temperatures of −40° to −70° F. made it a terrible journey, but it had to be done, for its aim was to collect material at the rookeries of the Emperor penguins, who have the strange and inconvenient habit of nesting in midwinter. "Any one would be a fool who went again . . . I for one had come to that point of suffering at which I really did not care if only I could die without much pain." It was a great achievement, and in many ways far more important than the polar journey itself. The record of that appalling ordeal alone makes the book worth reading.

Mr. Cherry-Garrard also took part in depot-laying in the southern autumn of 1911, in a supporting journey to lat. 85° 15′ S. for the polar party, and in the last search party which, under Dr. Atkinson's command, found the bodies of Captain Scott and his companions in their tent on the Barrier. Some of these stories have not yet been told by one who took part in them, and the author has drawn freely on the diaries and letters of his companions where necessary. Dr. Wilson's admir-

able panoramas done on the southern journey and several of his water-colours illustrate the book. Mr. Cherry-Garrard writes well and can give interest even to the monotony of sledging, but what we like best in his book is the total absence of any note of exaggeration. The book rings sincere from page to page. Incidentally, it is a very serious book : the tragedy of the expedition seems to overshadow it. We gather that the author's polar ambitions are satisfied. "Never again" is his final note. It is clear that he means it, and polar exploration thereby loses a good man. In one opinion we are inclined to disagree with Mr. Cherry-Garrard. Is exploration "the physical expression of the intellectual passion"? We doubt if the desire for knowledge, always put in the forefront of an expedition's programme, attracts men to the expedition, at least for their first time, so much as the thirst for adventure and the love of wild places. The second time one goes because it is too hard to resist the longing.

Two corrections may be made. Alexander Island, which was discovered by Bellingshausen in 1822 (not 1819), was not the first Antarctic land sighted. Bransfield saw Trinity Land in 1821. The *Belgica*'s wintering (1898-99) was the first Antarctic wintering. Borchgrevink was at Cape Adare in 1899-1900 and not in 1897. Mr. Cherry-Garrard lays great stress on the value of scientific work in the Antarctic, but at the same time he shows in his introductory chapter much interest in the making of records. R. N. R. B.

GENERAL.

A Geography of Imperial Defence. By Vaughan Cornish, D.Sc. London : Sifton, Praed and Co., Ltd., 1922.

This *Geography* has been written, the author informs us, as a text-book for Army Promotion Examinations in Imperial Military Geography. Dr. Cornish's previous work on the subject of the book is already known to members of the Scottish Geographical Society. The present volume covers a large field in less than 150 pages of good-sized type, dealing as it does first with the Geography of Population and Efficiency, the Geography of the British Empire, and then with the Defence of our Maritime Communications, of Great Britain, of India, and of the Britains beyond the Seas. It is a considerable achievement to have covered so much ground in this space ; and Dr. Cornish's treatment is throughout interesting and suggestive. Such sentences as the following start a whole train of thought :—

"The crossing of the Atlantic, which made Western Europe, including the British Isles, the centre instead of a terminus of maritime communications, brought with it new requirements in practical astronomy, and there soon followed great improvements in mathematics, in the instruments for recording time and measuring angles, and in optical aids to observation. On this foundation was modern physics built."

"Berlin is the best railway radiant for the interior of Eurasia."

There are inevitably a few points on which the author's statements do not quite carry conviction. Bearing in mind, for example, that the Suez Canal was once actually reached, once nearly reached, during the War by attacks across the Sinai desert based upon Palestine, it hardly seems accurate to say that "the presence of British troops in Palestine adds nothing to the security of the Canal" (p. 71). The reverse is rather the case. Again, one looks at maps which show the Annual Rainfall and the Religions of the World, and, remembering the Malays, wonders if it is quite true to say that "Islam is contained in the dry belt of the old World" (p. 69). We wish also that Dr. Cornish had taken his courage in both hands and given fuller, though no doubt controversial treatment, to the question of Air

Defence and communications. Probably his interesting book will stimulate further discussion of this and kindred questions.

Stories from the Early World. By R. M. Fleming. London: Benn Brothers, 1922. *Price* 15*s.*

This is a most attractive collection of stories from widely different places, which forms a continuation to the author's first volume, reviewed here last year (p. 137). Nigeria and Greenland, Polynesia and Sweden have all contributed, as well as China, Japan, Egypt, and so on. The stories as stories would be interesting to children, but they are doubly so to adult readers, for many side-lights are thrown on ancient times, and the unchangeableness of human nature is forcibly demonstrated. Also, the stories are still characteristic of the countries where they originated, and many of them, with slight variations, might have been written to-day. For instance, there is a most delightful Greenland tale of an untruthful husband (Kasiagsak the Trickster) who, whenever his wife found him out and reproached him, "only whistled and whistled and would not listen to anything she said."

The Chinese stories have that strange mixture of practical and mystical still found among the Chinese. Some of the older stories are interesting from an historical point of view. There is an Arabian account of Solomon with quite new views of international law. Perhaps the most delicious story of all comes from the Eskimos, and tells how the wolf became a sledge-dog. The son of a great hunter caught a young bear and harnessed it to his sledge, and then he caught a baby wolf. The description of his difficulties and the terrible snarling that went on is most amusing.

There is an Appendix by Professor Fleure, discussing the ways in which the stories illustrate the development of civilisation in the different parts of the world.

EDUCATIONAL.

Business Geography. By E. Huntington and F. E. Williams. With the co-operation of R. M. Brown and L. E. Chase. New Yale: J. Wiley and Sons, Ltd., 1922. 13*s.* 6*d. net.*

The name of Mr. Huntington among the authors of this book leads us to look for something original and attractive. And we are not disappointed. Mr. Huntington is a geographer who is not afraid of ideas. In his hands the subject never suffers from dry rot even if some of his statements challenge criticism. The factors of business geography are given as (1) the products of a community, (2) the needs of a community, (3) the conditions of transportation, and (4) the character of the people. Every business problem involves these four factors. The introduction of the last, difficult as it is to assess, marks the distinctive quality of this book and makes it compare favourably with other American books on the subject. In fact, this book is wholly geographical. The authors state that tests have shown that the average mental ability of the grown men of the United States is scarcely greater than that of a normal child of about thirteen years, and further, that less than half the people in the United States have sufficient ability really to utilise the education offered by the elementary schools. This is a very frank confession and makes us inclined to doubt the real efficiency of so-called intelligence tests, but our doubts vanish when we read on a later page, "if a person of any race has reached the point where he can read and understand a book like this, he has almost certainly inherited more than the average ability." Do the

authors wish to flatter their readers, or is the average mental capacity of the United States as low as they would have us believe? Perhaps they are right. The lead of Western Europe in modern civilisation is attributed (p. 76) mainly to climatic conditions, but in a later chapter stress is laid equally on geographical position, mineral resources, and racial character. The authors attach great importance to the *per capita* foreign trade of a country as an index of progress. It is true that they qualify the significance of this in regard to new or very large countries, but we feel that it is a figure whose meaning can easily be misconstrued.

The regional aspects of the subject are very briefly treated, but no student of geography should omit the chapters on the different continents. Even if they are short they are full of suggestions. A word of praise is also due for the exercises on each chapter, the useful statistical tables, and the full index. In one of the tables, which gives the population of the world's great cities, we note that fallacy of the census returns which lies in giving the figures of administrative districts regardless of built-over area. Thus in this list Manchester appears smaller than Liverpool, and Salford is omitted. Newcastle is the only Tyne town given, Leith is entered as distinct from Edinburgh, and Westham (spelt in one word) with its separate entry for a moment puzzles the British reader.

The Scope of School Geography. By R. N. Rudmose Brown, D.Sc.; O. J. R. Howarth, O.B.E., M.A.: J McFarlane, M.A., M.Com. Oxford: At the Clarendon Press, 1922. *Price 5s. 6d.*

The recent rapid progress in geography both as a school and as a university subject has rendered authoritative guidance necessary, alike to the teacher and to those responsible for drawing up schemes of work. This little book is therefore much needed, and should be widely read. Its authors rightly lay almost as much stress upon what the secondary-school teacher should omit as upon what he should include. This is essential, for all those who have done much examining know how great the danger is at present of extending the geographical curriculum so widely that the pupils acquire a smattering of the elements of many sciences, but little precise knowledge of geography proper.

The book begins with a short Introduction, which is followed by a series of chapters on the main divisions of the subject, with detailed suggestions as to matter and method. There is a final Summary and Conclusion. A small number of references are given in the text, but there is no Bibliography nor Index.

Though interesting and suggestive throughout, the chapters seem to us to vary considerably in value, and some indication of the difficulties of collaboration may perhaps be seen in the fact that they are not all on the same plan. Thus chapter vi., Geography in its Economic Aspects, which seems to us one of the best in the book, deals essentially with method, specific questions being only raised as illustrations. On the other hand, in chapter iii., Climate and Weather, some eight pages are taken up by a summary of Herbertson's division of the world into climatic regions. These pages contain a number of quotations from Herbertson's *Senior Geography*, a book which one would suppose would be easily accessible to the teacher. Similarly the chapter on Historical Geography gives a summary account of the historical geography of North America, limited for the most part to the facts readily available in the ordinary books of reference. It would seem as if space might have been saved by assuming knowledge of the main facts, and limiting the discussion to the desirable modes of presentation.

There are a few cases also where the authors have failed to realise the necessity for meticulous care in their illustrations, in order to avoid minor inaccuracies. This is very necessary in a book intended for teachers, and one moreover which

will doubtless be widely read by them. For example, some of the statements in the section on Vegetation appear likely to mislead. In speaking of coniferous forests, reference is made to "spruce and Scots pine in Scotland"; but the spruce is not a native tree in Scotland. A comparison is also made between "a larch forest in Scotland" and one "in the Ural Mountains or eastern Siberia," the statement being made that "each larch forest is composed of a distinct species." Scotland has no native larch; "forest" is a big word to apply to the limited larch plantations of this country, and those plantations are not of a single species, for the Japanese larch has been largely planted in recent years on account of the liability of the European larch to disease here. In the same chapter mention is made of the "striking absence of cultivable cereals in the New World," which is stated to be "one of the more fundamental facts in the distribution of civilisations"; maize seems to have been forgotten.

Human Geography. An Attempt at a Positive Classification: Principles and Examples. By Jean Brunhes. Translated by T. C. Le Compte. Edited by Isaiah Bowman and Richard Elwood Dodge. Chicago: Rand McNally and Co., 1920. *Price 25s. net.*

The original French version of Prof. Brunhes' book was reviewed at some length in an article by Mr. Chisholm which appeared in this *Magazine*, vol. xxviii. (1911), p. 561. The object of this translation is stated by the editors to be the making of Prof. Brunhes' point of view available to students in normal schools and colleges and to the general reader. They also specify certain changes which have been made "to meet the needs of American conditions." These involve the omission of chapters and sections, the reduction of the footnotes, and the addition of illustrations, footnotes, and text "to bring out significant and pertinent American facts in human geography." They also add that "in the revision of the proofs, regional references have been changed where necessary according to the latest information available." Neither the omissions nor the additions are indicated by any form of symbol, giving a result quite out of harmony with our traditions here; for without reference to the original there is no means of knowing whether any particular statement is to be assigned to the original author or to the editors. Further, since the adaptation to American conditions cannot be made complete in a volume which is based so definitely on data derived from the Old World, the effect of the editing is often unsatisfactory To take an example, on p. 255 we find the statement—"Wheat is a plant so exhausting that it is best not to sow it two years in succession on the same land." But what Prof. Brunhes says (p. 265[1]) is—"Wheat is such an exhausting crop that *it is never sown* two years in succession on the same land." (Italics ours.) His statement thus refers to conditions in Western Europe; that in the American edition seems to have no regional significance at all.

Again, it seems to us that there is a somewhat serious discrepancy between the extensive changes in *content* of the volume in its American form and the characters of the *style*. The translation does not seem to us invariably accurate. For example, on p. 264, in a quotation from Prof. Woeikoff we find the round statement that "Oats are the principal food for man ... in Scotland"; but on reference to the quotation as it occurs in the French version (p. 274) we find that the statement is made of "certain parts"[2] of this country; which is at least nearer the truth. Second, the translator does not appear to be sufficiently acquainted with

[1] The page references are to the second edition of *La Géographie Humaine* (1912).

[2] 'L'avoine est la principale nourriture de l'homme dans certaines parties de la Suède, de la Norwège, de l'Écosse. ...'

the correct equivalents of French technical terms. We note, for instance (p. 238), that the northern forest is said to be "of pure growth"; but M. Brunhes speaks of "peuplements purs," *i.e.* the trees grow in *pure stands*. Finally, there are not a few examples of that peculiarly unfortunate mode of translation which consists in replacing foreign words by English ones without considering the appearance of the resultant phrase. The legend of Fig. 124 reads as follows, "The Labour in Market-gardening. Under bell-glass, the vegetables grow in protection from the cold"; of Fig. 172, "Cultivation with a Special Arrangement" (*Installation Spéciale*). We feel, therefore, that the editors might have devoted their energies in the first place to making sure that their author was adequately interpreted, before proceeding to modify the contents of his book so extensively. In saying this we do not minimise the great difficulties of translating *La Géographie Humaine*; nor do we wish to appear ungrateful to the translator and editors for their labours. But there is undoubtedly a place for an English version of Prof. Brunhes' great work in the teaching of geography, and we think it wise to warn teachers and students alike that the use of this version should be supplemented by the original, if the author's point of view is to be clearly understood.

Principes de Géographie humaine. By the late Prof. P. Vidal de la Blache. Paris: Armand Colin, 1922. *Price* 25 *fr.*

The publication of this work is due to the devoted care of Prof. Emmanuel de Martonne, who in preparing the greater part of the work for the press had to piece together fragments of manuscript as left by the author at the time of his sudden death, but he had the advantage of sufficient indications of the author's intention to feel sure that most of the chapters are as the author would have had them. In any case he has taken care to introduce nothing but what came from the author's hand. The work so far as completed according to plan (for it remains a fragment) is divided into three parts, one on The Distribution of Man over the Globe, one on The Forms of Civilization, and the third on Transport. The first of these was found by the editor almost ready for the press. Several of the chapters indeed had already been published in the *Annales de Géographie*. It is the remainder of the work that had to be dealt with in the manner described. Of the work as it stands Prof. de Martonne says, "What appears most new in these pages . . . is not so much the astonishing erudition, the multitude of examples taken from the most diverse countries, as the manner in which the historical point of view penetrates, dominates, and inspires the examination, classification, and explanation of all the facts," adding, however, that the geographical point of view governs the whole study. "It is always to the localisation of types, the establishment of local relations that we are led in the end." As the author himself remarks, the very persistence of types in certain regions is a mark of geographical influence. In his search for data for study he goes back to the most remote past, even to prehistoric times, being satisfied that man when we first know him was already endowed with the same mentality as he now has (p. 26). What differentiates the man of the present day from his earliest ancestors in his modes of adapting himself to his environment is rather the result of slowly accumulated experiences than of any essential difference in mental capacity (pp. 115-116). "It is in their immediate environment that groups of men everywhere have begun to seek the means of acquiring the necessaries of life. In this search the majority have given proofs of ingenuity and inventiveness which show more original equality in human nature than our prejudices as civilised beings allow us to admit" (pp. 199-200).

Six maps illustrate the volume, two in black and white in the text and four

folding coloured maps at the end, all showing various facts of distribution. The first of the coloured maps illustrates distribution of population, a subject which it should be mentioned is not confined in the text to Part I. but is again considered in a special aspect in one of the chapters in Part II. entitled Human Settlements (*Les Établissements humains*), a chapter dealing with the distribution of villages and smaller inhabited spots in cereal regions, in mountainous areas, in fertile expanses with steep-sided valleys, etc. There is no separate treatment of towns, but that is the subject of a short fragment at the end evidently belonging to one of the uncompleted chapters of the book. On the map showing distribution of population according to density the author remarks in the text (p. 24) that the present distribution is manifestly only provisional. Undoubtedly, and it must remain so till coal, ore, and other irreplaceable materials are economically exhausted, till we are thrown back for mechanical motive power on the current sun-power (through direct sun heat, through vegetation, through wind and water power), till adequate means of transport have penetrated to all parts of the earth, and till all the peoples of the earth are educated intellectually and morally as nearly as possible to the same levels. The wealth of suggestion to be found in the volume might tempt one to go on indefinitely, but it must suffice to say with Prof. de Martonne that "geographers as well as historians and sociologists will read and re-read its pages with profit," that it is emphatically a book calling to mind Bacon's exhortation in reading "to weigh and consider." G. G. C.

Les Régions Géographiques de la France. Par Prof. Em. de Martonne. Paris: Ernest Flammarion, 1921. *Prix* 4 *frs.* 50 *cts.*

This little book is based upon a series of lectures given first at the Columbia University of New York, and subsequently at the Sorbonne in Paris, in a course intended for foreign students. It does not profess to treat of the whole of the Natural Regions of France, but is an attempt to bring out the main principles of physical and human geography by reference to those parts of France most likely to come within the cognisance of the traveller. The book may be warmly commended to the notice not only of the intelligent tourist, desirous of profiting by what he sees, but also to the student of geography. Without attempting a detailed review, we may draw attention especially to the chapters on Paris and on Provence as admirable examples of regional treatment. The chapters are furnished with brief bibliographies, and there are a number of diagrams. The style is clear and simple, and the book should be well within the reach of students possessing a moderate acquaintance with the French language. The price compares favourably with that of some recent English books.

Erratum.

The World About Us: A Study in Geographical Environment. By O. J. R. Howarth. On page 58 of the last issue the price of this book is stated to be 6*s.* 6*d.* instead of 2*s.* 6*d.*

BOOKS RECEIVED.

EUROPE.

The Deeside Field. Edited by A. Macdonald and J. B. Philip. With numerous illustrations, chiefly from Original Photographs. Issued under the auspices of the Deeside Field Club. Demy 4to. Pp. vii + 66. Aberdeen: The Rosemount Press, 1922.

Cannel Coals, Lignite and Mineral Oils in Scotland. By W. Gibson, D.Sc. (Memoirs of the Geological Survey, Scotland), 1922. Pp. 72. *Price* 2*s.*

The Races of England and Wales. A Survey of Recent Research. By H. J. Fleure, D.Sc. Crown 8vo. Pp. 118. London: Benn Brothers, 1923. *Price* 5*s.*

The Provinces of Ireland. Edited by George Fletcher, F.G.S., M.R.I.A. 8vo. Pp. xiv + 294. Cambridge: University Press, 1922. *Price* 8*s.* 6*d.*

The Mountains of Mourne: Their Charm and their People. By Louise M'Kay. 8vo. Pp 127. London: Jarrolds, Ltd. *Price* 2*s.* 6*d.*

L'Empire Britannique. Étude de Géographie Coloniale. Par Albert Demangeon. Crown 8vo. Pp. viii + 280. Paris: Librairie Armand Colin, 1923. *Prix* 7 *fr.*

Description Géométrique détaillée des Alpes Françaises. Par Paul Helbronner. Annexe du Tome Second. Les Origines Iconographiques de L'Œuvre Géodésique.

I. Tour D'Horizon Complet du Sommet du Mont Blanc.
II. Le Mont Blanc depuis le Sommet du Mont Maudit.
III. Le Mont Blanc depuis le Col du Géant.
IV. Le Mont Blanc depuis le Sommet du Belvédère des Aiguilles Rouges.
V. Le Mont Blanc depuis le Sommet de L'Aiguille du Tour.
VI. Le Mont Blanc depuis le Sommet de l'Aiguille du Moine.

Paris: Gauthier-Villars et Cie, 1921. Presented by the P. L. M. Railway Co.

The Banks of the Rhone, from Lyons to Arles. By Gabriel Faure. Water-Colours by Pierre Vignal. Translated by Frank Kemp. Royal 4to. Pp. 100. Grenoble: J. Rey, 1922. Presented by the P. L. M. Railway Co.

Notice sur la Carte au 20,000e de la Vallée de Sales et du Cirque des Fonts (Alpes Calcaires du Faucigny). Par Robert Perret. Pp. 82. Paris: Henry Barrère, Éditeur. 1922.

Vilna et le Problème de l'Est Européen. Par Georges Moresthe. Pp. 129. Paris: Éditions Bossard, 1922.

La Tchécoslovaquie et les Tchécoslovaques. Par V. Dědeček. Un vol. in-16. Pp. 196. Paris, 1919.

La Guerre en Russie et en Sibérie. Par Ludovic H. Grondijs. Un vol. in-8. Pp. xi + 574. Paris: Éditions Bossard, 1922. *Prix* 33 *fr.*

Iranians and Greeks in South Russia. By M. Rostovtzeff, Hon. D.Litt. Demy 4to. Pp. x + 260. Oxford: Clarendon Press, 1922. *Price* £4, 4*s.*

Le Problème de L'Unité Russe. Par Emile Haumant. Pp. 128. Paris, 1922.

The Balkans: Roumania, Bulgaria, Servia, and Montenegro, with new chapter containing their History from 1896 to 1922. By William Miller, M.A., Hon. LL.D. Crown 8vo. Pp. xvii + 538. London: T. Fisher Unwin, Ltd., 1923. *Price* 7*s.* 6*d.*

The Peaks of Shala: Being a record of certain wanderings among the Hill-Tribes of Albania. By Rose Wilder Lane. Demy 8vo. Pp. 224. Illustrated. London: Chapman and Dodd, Ltd., 1922. *Price* 12*s.* 6*d.*

Balkanised Europe. A Study in Political Analysis and Reconstruction. By Paul Scott Mowrer. Demy 8vo. Pp. x + 349. New York: E. P. Dutton and Co., 1922. *Price* 5 *dollars.*

La Roumanie (Valachie—Moldavie—Dobroudja). Par Eugène Pittard. Un vol. in-8. Pp. 327. Paris: Éditions Bossard, 1917. *Prix* 24 *fr.*

Constantinople. Les cités franque et levantine (Pera—Galata—Banlieue). Par Bertrand Bareilles. Un vol. in-8. Pp. 405. Paris: Éditions Bossard, 1918. *Prix* 24 *fr.*

ASIA.

The Turkish Empire from 1288 to 1914, by Lord Eversley; *and from 1914 to 1922*, by Sir Valentine Chirol. With a Frontispiece and three Maps. Demy 8vo. Pp. 456. London: T. Fisher Unwin, Ltd., 1923. *Price* 21*s.*

The Western Question in Turkey and Greece: A Study in the Contact of Civilisations. By Arnold J. Toynbee. Demy 8vo. Pp. xxxvi + 408. London: Constable and Co., Ltd., 1923. *Price* 18*s. net.*

Les Peuples de la Transcaucasie pendant la Guerre et devant la Paix. Par G. La Chenais. Un vol. in-16. Pp. 215. Paris, 1921.

Lands of the Thunderbolt: Sikhim, Chumbi and Bhutan. By The Earl of Ronaldshay, P.C., G.C.S.I., G.C.I.E. Demy 8vo. Pp. xvi + 258. London: Constable and Co., Ltd., 1923. *Price* 16*s.*

The Ins and Outs of Mesopotamia. By Thomas Lyell. Cr. 8vo. Pp. 237. London: A. M. Philpot, Ltd., 1923. *Price* 7*s.* 6*d.*

Town-Planning in Patiala State and City. A Report to H.H. The Maharaja of Patiala. By Prof. Patrick Geddes. Lucknow, 1922.

A Burmese Arcady. An Account of a Long and Intimate Sojourn amongst the Mountain Dwellers of the Burmese Hinterland, and of their engaging Characteristics and Customs, etc. By Major C. M. Enriquez. With Illustrations and Map. Demy 8vo. Pp. 282. London: Seeley, Service and Co., Ltd., 1923. *Price* 21*s.*

Malaya. The Straits Settlements and the Federated and Unfederated Malay States. Edited by R. O. Winstedt, M.A., D.Litt. (Oxon.). Illustrated. Demy 8vo. Pp. xi + 283. London: Constable and Co., Ltd. *Price* 12*s.*

From Golden Gate to Golden Sun. A Record of Travel, Sport and Observation in Siam and Malaya. By Hermann Norden. Crown 8vo. Pp. 292. London: H. F. and G. Witherby, 1923. *Price* 15*s.*

L'Évolution de la Chine. Politique et Tendances, 1911-1921. Par André Dubosco. Un vol. in-16. Pp. 194. Paris: Éditions Bossard, 1921. *Prix* 9 *fr.*

Report on the Administration of Burma for the year 1920-1921. Rangoon: Office of the Superintendent, Government Printing, Burma, 1922. *Price Rs.*3.

A La Conquête des Cœurs. Le Pays des Millions d'Éléphants du Parasol blanc: Les Pavillons noirs, etc. Par Auguste Pavie. Préface de Georges Clemenceau. Un vol. Pp. lii + 352. Paris: Éditions Bossard, 1921. *Prix* 30 *fr.*

AFRICA.

Sport and Adventure in Africa: A Record of Twelve Years of Big Game Hunting, Campaigning, and Travel in the Wilds of Tropical Africa. By Captain W. T. Shorthose, D.Sc. Demy 8vo. Pp. 316. London: Seeley, Service and Co., Ltd., 1923. *Price* 21*s. net.*

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Inca Land: Explorations in the Highlands of Peru. By HIRAM BINGHAM. Illustrated. Demy 8vo. Pp. xvi + 365. London: Constable and Co., Ltd., 1922. *Price* 24*s.*

Geography of the Central Andes: A Handbook to accompany the La Paz Sheet of the Map of Hispanic America on the Millionth Scale. By ALAN G. OGILVIE, M.A., B.Sc. Crown 8vo. Pp. xi + 240. Research Series No. 1. New York: American Geographical Society, 1922.

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Geomorphology of New Zealand: Part I.—Systematic: An Introduction to the Study of Land-Forms. By C. A. COTTON, D.Sc., F.N.Z. Inst., F.G.S. Demy 8vo. Pp. 462. *Price* 22*s.* 6*d.* Dominion Museum, Wellington, N.Z., 1922.

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Two Years in Southern Seas. By CHARLOTTE CAMERON, O.B.E., F.R.G.S. Illustrated. Demy 8vo. Pp. 315. London: T. Fisher Unwin, Ltd., 1923. *Price* 21*s.*

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ARCTIC AND ANTARCTIC.

Among Unknown Eskimo: An Account of Twelve Years' Intimate Relations with the Primitive Eskimo of Ice-Bound Baffin Land, with a Description of their Ways of Living, Hunting Customs, and Beliefs. By JULIAN W. BILBY. 33 Illustrations and Map. Demy 8vo. Pp. 280. London: Seeley, Service and Co., Ltd., 1923. *Price* 21*s.*

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A Smaller Commercial Geography. By George G. Chisholm, M.A., B.Sc. (Edin.), and J. Hamilton Birrell, M.A., F.R.S.G.S. New edition. Crown 8vo. Pp. xiv + 302. London: Longmans, Green and Co., 1923. *Price* 5*s.*

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Junior Regional Geographies. By W. H. Barker, B.Sc., F.R.G.S., and Leonard Brooks, M.A., F.R.G.S. Book II. The British Isles. Crown 8vo. Pp. vii + 174. With 48 Illustrations. London: University of London, 1923. *Price* 2*s.*

Europe: A Descriptive Regional Survey. By T. S. Muir, M.A., F.R.S.G.S. Crown 8vo. Pp. 304. Edinburgh: W. and R. Chambers, Ltd., 1923. *Price* 2*s.* 6*d.*

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A Canadian School Geography. By George A. Cornish. With numerous Sketch-Maps, Diagrams, and Illustrations. Crown 8vo. Pp. xv + 450. Toronto and London: J. M. Dent and Sons, Ltd., 1922.

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Presented by Professor E. D. Cholnoky, Budapest.

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Plan Miasta Lwowa. Scale 1 : 15,000. *"Atlas," Lwow.*

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GENERAL MAPS AND ATLASES.

MARINE WORLD CHART OF NICOLO DE CANERIO JANUENSIS, c. 1502. Facsimile.
Presented by Edward Luther Stevenson, Ph.D., Professor of History in Rutgers College.

THE HANDY REFERENCE ATLAS OF THE WORLD. 10th edition. Edited by John Bartholomew, M.C., M.A., F.R.G.S. Prices from 12s. 6d. net.
John Bartholomew and Son, Ltd., Edinburgh.

The present edition has been completely remodelled, more maps have been added, while the index has been extended. The former now runs to 223 pages, while the latter contains 35,000 place names. A gazetteer and statistical tables account for a further 60 pages. When it is considered that all this is contained within the limits of a crown 8vo volume it will be seen that the atlas justifies its title.

ATLANTE DI GEOGRAFIA MODERNA.—By Professors Giuseppe Ricchieri and Carlo Errera. Price 25 lire.
Istituto Italiano d'Arti Grafiche, Bergamo.

The maps in "Testo e Atlante Scolastici di Geografia Moderna" are here issued without the text. The treatment of some of the regional maps is somewhat exceptional. In addition to the layer colouring, the mountain chains are shown by brown lines, the peaks by circles, and the lower slopes by hachuring. We do not think that anything is gained by this elaboration.

THE CANADIAN SCHOOL ATLAS, prepared at the Edinburgh Geographical Institute, under the editorship of George A. Cornish, Associate Professor of the University of Toronto.
J. M. Dent and Sons, Limited, Toronto and London.

PLANIGLOBY POLITYEZNE. By E. Romer.
Eastern and Western Hemispheres. *"Atlas," Lwow.*

ATLANTE DEI TIPI GEOGRAFICI, in 78 sheets with descriptive notes. Compiled by Olinto Marinelli, from the Istituto Geografico Militare. 1922. Firenze.

From the preface to this work we learn that twelve years ago the Military Institute issued a series of notes on representative maps illustrating the typical forms and characteristic features of the Italian soil. It appears to have been favourably received, but the Chief of the Military Institute recognised that even an amplified edition of this collection would no longer meet present requirements. The present edition, therefore, has been cast on bolder lines, and selected areas, even if they run into several sheets of the 1 : 25,000 or 1 : 50,000 maps, have been joined and issued as one. To all interested in the study of land forms this great portfolio will prove a well of information. Typical examples are shown, while each map is accompanied by illuminative text and there is a useful bibliography. Could not the Ordnance Survey follow the lead of the Military Institute and produce for our country something along similar lines?

THE SCOTTISH GEOGRAPHICAL MAGAZINE.

THE NEGRO-HAMITIC PEOPLE OF UGANDA.[1]

By the Rev. JOHN ROSCOE, Hon. M.A. (Camb.).
Hon. Canon of Norwich.

(With Map and Illustrations.)

A TRAVELLER may easily pass through those regions of Africa about which I wish to speak, without seeing or hearing anything that will excite in him more than a casual interest in the superficial peculiarities of native life. Years of residence in the country, studying native problems and striving to understand the motives which impel its inhabitants to do the many extraordinary things they do, opened to me new and deeply interesting lines of thought, and aroused a desire to learn the history of the people themselves and of their country, so that it might be written and laid before the world. I am convinced that we are on the eve of discoveries which will help to solve many of the questions which have puzzled investigators in other regions, and will enable us to read clearly what is now so perplexing, and to all appearance, meaningless.

The study of the peoples of Uganda has led me to the conclusion that the present inhabitants are not the descendants of those who originally dwelt in these lands. There must have been others who were superior in skill and art to those negro races whom we regard as the aborigines and primitive inhabitants. There are traces of men possessing a knowledge of mining, of stonework and of art, which no longer

[1] A lecture delivered to the Royal Scottish Geographical Society in Edinburgh on Dec. 7, 1922.

exists, and concerning which neither history nor tradition can be found among those who now live there.

When I first collected my notes of the customs of the Baganda several striking matters came to my notice. In one part of Buganda there were, in a place called Ntanda, deep holes which were said to be the abode of the god of death. The people feared these holes, and each year an offering was sent to the priest who resided in that part so that he might kill and throw down the holes some animal or fowl. These holes have now been examined by the Government geologist, who says that they are shafts of old mines from which iron or other metal was dug at some remote age.

Again, those of us who journeyed to Buganda through what was then known as the Ugogo plains or deserts, found in the Mugumdu Mukali two deep wells. This was the only place for some miles round where water could always be found, and it was these wells which enabled travellers and traders to traverse these otherwise waterless tracts. The wells, which were called by the Swahili porters the Watuturu wells, had been dug through the rock until water was reached at a depth, so far as I can remember, of some fifteen to twenty feet, and the two wells were connected by a subterranean passage.

In various parts, too, stone implements have been found. I have myself seen several round stones with a hole through them which I am told were originally used for the heads of digging-sticks, though by those who now possessed them they were regarded as fetishes. During my last expedition I heard of some megaliths in one part of Bunyoro, but as it was impossible to visit the place, I asked the geologist to have them examined when he had an opportunity. He later sent me a sketch of them, showing that they are stones or large boulders piled one on the other, the top being at least twenty feet high. Again, there are in southern Buganda, in the Budu district, traces of ancient buildings; other ruins are said to have been found by geologists in Bunyoro, while in South Africa there are the famous stone ruins of Zimbabwe. All this shows that there were men of a former age whose methods of building and working differed from those of the later ages. The inhabitants of the land to-day have given strange and superstitious explanations of these remains, but to him who is seeking for traces of an earlier race, these are sure indications of the activities of its workers, and when something of their history can thus be pieced together we may be able to read more clearly a connected story of that great continent. Pioneers such as Grant, Speke, Baker and others who followed them to this great field have cleared up many difficulties and given us fairly accurate accounts as far as they went, but the details have still to be filled in, and this work is now being done.

The ethnologist has his share in this work, and it is to this branch of research that my own attention has been turned for the past thirty or more years. I am sorry that I lost many valuable opportunities during the first few years of my African experiences owing to the fact that,

being ignorant of the importance of the work, I was not careful to note all that I saw. Still, some items of importance which I then learned have remained fixed in my mind.

From the year 1884, when I first visited Africa, until the Uganda railway was built, it was necessary to pass inland to Lake Victoria

through what is now the Tanganyika Protectorate. Those journeys carried the traveller through the various tribes inhabiting the regions from the coast opposite to Zanzibar, which was the starting point, to the interior. From the coast to Lake Victoria, some eight hundred miles, no tribes large enough to be dignified by the name of nations were encountered. The Wanyamwezi had lost their famous king Mirambo

and were split into a number of sections under small chiefs. Apart from this king there does not appear to have been any chief of importance in those districts who sought to do more than rule the people of his own small village. The tribes were invariably divided into clans dotted about here and there, who only held intercourse with each other when marriage questions forced them into contact, or when some invasion of their district caused them to combine to resist a common enemy.

When the traveller crossed Lake Victoria or passed round the western side of it he came upon another group of people, for here he met with the pastoral, or, as they call themselves, the Bahuma peoples, who had brought the negro races into subjection and formed large communities worthy of being called nations. They had, however, not all advanced to the same level of civilisation, and I should like in the first instance to say a little of the section of this group called the Baganda, who had advanced far beyond their kindred in Ankole, Bunyoro, or even Ruanda. Speke and Grant mention them as being intelligent but cunning; it was Stanley, however, who first drew the attention of the world to them and caused the early missionaries to visit them. The Baganda are a mixed race, for they have not adhered to the restrictions usually observed by pastoral peoples and have intermarried with the negro tribes whom they conquered. Their religious customs formed a striking contrast with those of the peoples around them, for they had developed an organised system of worship with priests and their assistants, rather like that of the early Hebrews. Ceremonies accompanied by human sacrifices were frequently held, and the large number of victims put to death on these occasions was a serious drain upon the population of the country. On the other hand, the elimination of the weaklings, the mentally deficient, and of criminals convicted of murder, theft, or other vices, who formed the bulk of such victims, left the more capable, and, according to their lights, the more upright to propagate the tribe. This is the only solution I can offer of the wonderful progress made by these people and of their remarkable intellectual capacity; what was left was the best material, capable of noting and taking advantage of all they saw around them, while their desire to please their chiefs, lest they too should be seized and sacrificed to the gods, imparted zeal and energy and kept them always ready to try what was new.

Both mentally and physically they were in advance of the surrounding tribes, and the organisation, political, civil, and military, of their government was remarkable. Roads, with bridges over rivers and swamps, stretched for miles from the capital to the residences of chiefs who, like the lords of our own feudal times, governed large tracts of country. The courtesy shown by these men not only to their superiors but also to equals was astonishing. They had abandoned the nomadic life of the original pastoral tribes and were cultivators of forests of plantains, while meat was seldom absent from their meals. Large markets were held frequently at well-known spots where vegetable food and meat, ironware, pottery, salt, tobacco, bark-cloth, and animals were sold and

bartered. The upper class of these people still bore traces of the better features of the Bahuma stock, though the more finely chiselled features and good noses were rapidly deteriorating into the more negroid types. The skill of these men and their readiness in understanding and copying anything they saw was astonishing. I have seen a folding-chair with its cane seat and back reproduced in a remarkably short time, so accurately that the only easily detected difference was in the thread of the bolt which fixed the chair together, which had been cut with a knife or axe blade. Their bravery in war and their love for the war-path made them feared by the tribes around.

Many of their ceremonies—for example, the long period required for embalming the body of a dead king and the preservation of the jaw-bone and other relics for deification—raise the question of the origin of such ideas. The general and strong feeling which restrained the king from taking any woman but a half-sister to be his queen, and the stringent laws which forbade any other princess than the one the king espoused to marry, cause the mind to turn to the customs of the early Egyptians.

Where then, one naturally asks, did these men come from, and what are they doing in this part of the world? They stated that they were immigrants, and the fact that they had rules of social life contrasting strongly with the serfs among whom they lived gave support to the statement. The older inhabitants were admittedly pure negro tribes who, however, have blended with the pastoral invaders and assimilated their customs and beliefs until the two have become one nation.

The district of Buganda is an excellent soil for plantains, and these form the staple food of the people. There are plantain groves attached to every home, and in the past no woman would have consented to marriage unless the man could furnish her with a field of her own and possessed also the trees which yielded bark-cloth for clothing. The women were the sole workers in the plantain groves, and it was not difficult for a woman to support her husband and two or three other free-men as well as her family. The country, lying as it does, surrounded by lakes, bounded by Lake Victoria on the one side and by the river Nile along its northern boundary, and being intersected by tributary streams and marshes, is always moist, and the rainfall is good, which all tends to the ready growth of this tree. The sites of the groves need to be constantly changed, for after some five years the land becomes exhausted and the plants do not yield their best. This, together with the fragile and insanitary buildings erected as huts, made frequent movement essential, a condition which was beneficial to the health and vigour of the nation. I noticed during my last visit that the country round Kampala was being drained, which from the white man's point of view was a necessary step as the only safeguard against mosquitoes. The natives, too, are settling in more permanent habitations round the Government quarters, and these two changes are telling upon the culture of the plantain, which has deteriorated, and according to the native account is fast becoming diseased. The natives attribute

this to the introduction of civilisation, and in a sense they are right. Some of them, however, attribute the disease to the railway which now runs between the capital and the Lake, for they say that the sound of the engine whistle stimulates the destructive grubs to fresh energy.

The coffee-tree has been known for many generations, and is in fact indigenous in the islands of Lake Victoria. The Agricultural Department states that the natives are becoming experts in cotton-growing, and as the country is suited to the growth it is expected to rival Egypt in its production of even the finest qualities.

During my expedition, which was so adequately financed by Sir Peter Mackie, to whose generosity I am deeply indebted, I was able to penetrate into places I had never before been able to reach. The result was that in the case of two tribes investigated, the Banyankole and the Banyoro, a fairly full account of their sociology has now been placed on record. The object was to try to throw further light upon the problems of these Negro-Hamitic tribes, and I think that some success has been attained. Other tribes were more rapidly surveyed and notes made which it is hoped will be of value to future investigators.

The Banyankole are acknowledged to be the oldest of these Negro-Hamitic people in this district, and they are without doubt the nearest to the original stock both in customs and in their blood relationship. They rarely, even now, intermarry with the negroes, whom they regard as serfs and utterly beneath them. They have, until within the last few years, lived entirely upon milk diet and given their time and thought to their cattle. As we might expect, their advance from the primitive customs of past ages has been slow, and until the missionary and later the British Government introduced new ideas among them, their social life and civilisation were much as we can picture those of their fathers four or five hundred or more years ago. They were nomadic and their houses were never intended to last more than a few months, because of the necessity of moving forward with their herds to some new grazing-ground. Yet the head of the tribe was a man whom they regarded as of royal birth, and no man but a prince royal could reign over them. This man held supreme authority over all the herds, though each chief acted as if the cattle under him were his own. The ruler of this tribe had to take his life by poisoning himself when he felt his powers waning through old age, or when he was afraid that sickness of a severe nature was upon him.

There are traces also of matrilineal customs here, but owing to the old habit of destroying every trace of the former king and to the absence of records, it is impossible to follow up any clues or even to ascertain the names of the former kings for more than three generations back, while still less can be discovered regarding their mothers. Yet in this country princesses were allowed to marry, and more than this, the king's eldest sister would only marry the man of her choice and might refuse to accept any man her brother the king wished her to marry. This took place in the case of the present king's sister, for her brother wished

her to marry a man he had chosen ; she, however, refused, and resisted the king, though for several years he would not see her or allow her to come near him. There is reason to believe that it was the son of the king's sister who became king on the death of the reigning king. Another token of the importance of women is that the sister of the heir to any property had to purify it for her brother, and when she had done this she took for her own a portion of the property. In most tribes, and especially among the negroes, the women are little removed from the status of slaves, and never hold property, except where mother-right holds sway.

The aborigines are in this country also regarded as serfs, and though they had a great amount of freedom, yet they were expected to do the more menial work of the Bahuma, whose superstitions led them to believe that any manual labour, other than what was essential for the welfare of the cattle, was detrimental to the herds. Vegetable food and meat from any animal except the cow was taboo, and even beef could only be eaten when a period of abstinence from milk was observed.

Among the people bordering on the Belgian Congo and Ruanda I did not find much that was helpful in my particular line of research. The untamed Bakyiga, who inhabit the southern Ruwenzori range, are undoubtedly a negro tribe of a primitive order, very likely a portion of the Bagesu of Mount Elgon, who migrated into these hills at some not very remote age. These people were singularly destitute of any history, and no traditions extended further back than two generations. They stated that their forefathers came from the north-east, but could give no account of the place from whence they came. Geographically the district is interesting, as the mountains there form the watershed separating the streams which flow to the north and to the south or south-west.

The Banyoro, or, as they should be called, the Bakitara, are an older branch of the Baganda, and at one time their kings were the most important in that part of the country. Here again we find that the wealthy classes are of pastoral or Negro-Hamitic stock, but there is a difference between them and the Ankole people and also the Baganda, for here, though the serfs do not differ greatly from those in Ankole, and are treated with much the same kind of scorn, there is a middle class formed of the children of the more able men of the serf class, who through ability have become prosperous. These were allowed to take wives from the poorer herdsmen, and their children have been permitted to marry into any rank of the Bahuma class. The purer blood of the pastoral people is therefore more difficult to trace than in Ankole, where pastorals still refrain from intermarriage with serfs.

The extraordinary milk-customs which were followed by these people until quite recently are of deep interest. The king was to them a deity who by his daily routine of life bestowed blessing and increase upon the herds and their milk. There is now no longer any restriction placed upon milk-drinking ; indeed, it has fallen to a minor place in the

day's food. At one time the king was not allowed to eat any meat at all except once daily a ceremonial meal of four small pieces of beef. Each afternoon this was taken with much ceremony, and each piece was placed in his mouth by a specially purified cook. The king was too sacred to touch the meat with his hands, and the man who put it into his mouth did so with a metal fork, taking care that the metal of the fork should not touch the king's teeth, because that would have meant instant death to him. When the king drank his ceremonial milk after the morning and evening milking, silence had to be maintained throughout the courts, and all the people knelt and covered their faces until the guard announced that the king had returned to the throne-room. Should the sound of coughing or clearing the throat be heard among

Fig. 1.—Banyoro milkmaid presenting milk to the king.

any of the inmates of the enclosure during this ceremony of drinking milk, the offence was punishable by death. To drink any of the milk from the herd of cows reserved for the king was a serious matter, but when any man was admitted to the Sacred Guild of the king he had to drink of it. This was the highest honour to which men could attain, and so solemn was the ceremony that it caused the newly admitted to tremble and at times even to faint. They had to be supported by one or more older members of the Guild during the performance, and were prompted by them at each step like children. Another solemn ceremony among these people was observed at the appearance of the new moon, when the king gave his blessing to the land, and work ceased for nine days, during which a festival, with dancing and music, continued day and night without ceasing, save now and then by the royal order, when some other ceremony, also of national importance, was taking place.

Among these people, as in Buganda, when the king died he was buried with human sacrifices. Two or more wives of the king entered the grave with him, taking their places at his sides, and were buried alive in order to accompany him to the other world and perform duties for him similar to those which they had rendered in this life. In Bunyoro there was no mummifying of the body, but there was an annual ceremony, when a man from a certain clan was chosen to personify the late king. For seven days he reigned in the temple of the king, receiving regal honours, and at the end of his reign he was taken away and strangled.

The Bunyoro nation has among its population some of the most advanced and skilful iron-workers to be found in Central Africa. Their iron-work found its way into many parts of the continent, and the salt from their celebrated salt mines on Lakes Albert and Edward was at one time carried many hundreds of miles. The workers in iron and also the salt workers are all of the serf class, the older branch of the present inhabitants.

Both in Buganda and in Ankole the people are strictly careful to abstain from any scarifications or mutilations, but in Bunyoro there is the custom of extracting the six front teeth in the lower jaw. This is done to both sexes at puberty, and takes the place of an initiation ceremony.

It will be noted that in this part of the Uganda Protectorate there are two distinct groups of people—the ruling class, who are Negro-Hamitic, and the Negroes. The negro races, the older inhabitants of the land, are the less capable mentally, yet in most respects they are more docile and more easily ruled. In physique they are short, muscular, and thick-set, with round heads, woolly hair, thick lips, and bridgeless noses. In all instances examined by me they are the tillers of the land, both men and women taking their share.

Among the ruling class the men are slim and tall, with good features, noses inclined to the Roman, longish faces, thin lips, skin of a brownish tint, and hair inclined to be wavy. The women, who are not allowed to do any work beyond attending to the milk-pots and butter-making, grow enormously fat from the quantities of milk they drink and the absence of all exercise. The men avoid all labour except what is connected with the rearing of cattle, for, according to their milk traditions, agricultural pursuits are distasteful to them. It will thus easily be understood how, in Buganda, when the transition came from the purely milk customs, and the plantain was accepted for food, the men added to their harems negro women who would do the digging, and produce the vegetable food required, leaving the men free to herd their cattle, build their houses, and fight.

When the Victoria Nile is crossed a different group of people is met with, and the language of these so-called Nilotic tribes differs considerably from the Bantu languages, though owing to the incursions of the Banyoro and the Baganda there are many people to be found who speak

the languages of Bunyoro or Buganda. Since the British took possession the Bantu languages, especially Kiswahili, have penetrated far into places where as yet the Europeans have not been able to go. So far as I am able to tell, the use of the Nilotic languages extends from Lake Rudolf to the sudd area of the White Nile, and something akin, in the form of a kind of bad Arabic, is spoken in the Sudan.

The Teso and the tribes on Mount Elgon, such as the Bagesu,

Fig. 2.—Cannibal of Ruwenzori.

together with the Basoga near Lake Victoria, are all, I believe, of the negro type. They were in possession of the land before the Negro-Hamitic incursions, and by the pastoral people they would be called serfs. In many places these tribes are of a low type who go nude, married women alone wearing small belts with aprons, about six inches by four, attached, which indicate that they are married. A feature of these negro tribes from Mount Elgon to Lake Albert is their tendency to cannibalism, which I imagine to be generally of the more restricted kind termed ceremonial cannibalism. The object of this form of

cannibalism, so far as I could discover, was to dispose of the dead in the safest manner. No dead person may be buried, because this would bind the ghost to this world, and therefore the relatives must eat the body during the three or four days of mourning which follow the death. In this custom we seem to have the underlying principle of that form of cannibalism which to the western mind is so horrible. It is practised from the same reason as so many early or primitive customs of which we have survivals in our own land, that is from a desire to do the best for the ghost and to give it the fullest possible chances in the other world.

Moving in a westerly direction from Mount Elgon, in the east, towards the Nile and crossing it in the region of Lake Albert we find, as we go down to the Congo and continue westwards, other cannibals whom the desire for human flesh has degraded until they seek to slay their fellow-men in order to gratify this craving. On Mount Elgon and indeed along the Victoria Nile there is, so far as I can at present trace, little of this degraded cannibalism, though occasional cases are to be found. The chief desire is to help their own dead by a sacred meal during the days of mourning.

The cursory study of these people did not advance my own particular research work, for I soon saw that they were not the class of people who would add much to the history of the Negro-Hamitics in whom I was specially interested. What I learned on Mount Elgon was that the Bagesu have a tradition that they have not been inhabitants of the mountains for many years, but that they came from the plains to the east and were driven to seek refuge on the mountains by the incursions of the Nandi and more warlike people in those easterly districts. Their elaborate initiation ceremonies, however, arrested my attention, and not only made me anxious to see them performed, but also gave rise to much thought as to the object of the custom and its spread. I concluded that the Bagesu have introduced circumcision from the pastoral people to the east, whose customs they have to some extent adopted. Their women inflict scarifications upon themselves but undergo no operation like the pastoral women of the east.

Further study of the Basabei, another set of pastoral people belonging to the Hamitic stock, adds something to our knowledge of what I believe to be the migrations of the pastoral peoples. It was here for the first time that I noted what a clear line of demarcation there is between the various groups of pastorals. Those I had been investigating in the south and south-west have a strong objection to mutilations, the Banyoro with their custom of extracting the front teeth being the only exception in the tribes examined. To the east and north-east of Mount Elgon there is a general custom of circumcision, which is followed by other tribes in those districts. These people from the east are always at bitter enmity with the pastoral people to the south-west, and yet, so far as we can tell from our present knowledge, there seems to be little doubt that they are all of the same original stock. The deeply interesting customs of initiation, when youths are circumcised

and young women undergo a corresponding ceremony to admit them to the full rights of clan or tribe, cannot, I think, be attributed at all to the propaganda of Islam, for they seem to be of much older origin and differ considerably from Islamic rites. When we take into account the former slow means of communication and the tribal resistance to the introduction of any new ceremonies in their religious observances, we may conclude that this custom has been observed for a much longer period than could be accounted for by the influence of Mohammedanism. We have, however, to face a difficulty as to which of the immigrations, that from the east or that from the south-west, is the older. It was my intention to go into Karamoja and on to the tribes along the frontier of Abyssinia, but there were some disturbances among

Fig. 3.—Mountain scenery on Mount Elgon.

these tribes; my letter to the officer in command asking for permission to pass through the disturbed area unfortunately miscarried and I got no reply until months later. I therefore went eastward to Mount Elgon and then came home down the Nile *via* Khartoum.

My impression is that we shall, by turning to the tribes lying between the Uganda Protectorate and Abyssinia, learn more of the earlier migrations in Africa, and I have a strong feeling that from that quarter we shall obtain much that is denied us in the region we have so far been able to investigate. It is also my hope that we shall learn something that will enlighten the Egyptologist and clear up some of the difficulties respecting the early temples. We can base little reliance upon language as a guide to distribution. It is a help, but it cannot be regarded as an infallible guide.

The distribution of weapons, the methods of warfare, and the means

of defence are worthy of note as aids in the study of migrations. We find among the Masai the long iron spear which is copied by the tribes to the east, and the short sword and heavy cow-hide shield. Most of the warrior tribes such as the Nandi, Kavirondo, Masai and the eastern tribes use these weapons. In the south and south-west there is the smaller leaf-blade spear and a lighter kind for throwing, while the shield is a wooden frame covered with cane-work. Bows and arrows are used most extensively by the Kamba people to the east, who also employ poison for their arrows, and in a lesser degree on Mount Elgon. In the south-west the Banyankole have some knowledge of the bow but do not use any poison on their arrows. The Pygmies to the west are experts with poisoned arrows, but we know so little of them and my personal knowledge is so small that I refrain from further remarks. Clubs and pointed sticks I have met with in the Usagara district in Tanganyika colony, and among the Ankole people away in the centre of the lake district I have found the pointed stick, hardened by fire, used instead of the spear.

The use of iron appears to have spread from the lake district and to have been carried east and west and further south. All iron, and so far as I have been able to discover, copper also, in the shape of hoes, knives, weapons, and ornaments, travelled from this central district until its output was met in later days by the imported implements coming from the sea-coast. Stone anvils and stone hammers are still to be found in use in this area.

The pastoral people to the south-west have no buildings for defence, but trust to rapidity of flight when overcome in battle or when an army suddenly invades their country. The tribes to the east build houses with mud walls in which are loop-holes through which weapons or arrows could be thrust or shot at any one who ventured near in order to break in. The houses were so arranged that they enclosed a space or square into which the cattle were driven by night, and they had mud roofs which made them secure against destruction by fire. In such places the inhabitants were comparatively safe from their foes, who used only spears or bows and arrows.

The negro tribes in many of those easterly districts trusted for defence to their positions among the hills, where they could block the paths to their villages and make it difficult for invaders to reach them. Their places of refuge were so chosen that they could stand and hurl stones upon those who attempted to climb the steep paths.

An examination of their industries and arts shows considerable skill, though methods are still most primitive. The iron-workers collect the best kinds of stone, and have discovered how to mix various kinds in order to obtain metals of varying degrees of hardness. Their furnaces, too, are ingenious, though primitive, for they are merely deep holes in the ground into which a blast is forced by bellows consisting of pots or in some instances wooden bowls covered with skin. This covering is raised and thrust down sharply, driving the blast down a pipe into the

furnace. Their knowledge of the use of charcoal and the best wood for making it is also interesting. Iron working is almost confined to this region on the east side of Africa, and, though it has spread to other districts, it is not developed there to any extent.

Pottery, though in different parts it differs slightly in pattern or in decorations, is everywhere made by the same method of building up the sides of the pots in spiral coils of clay. The decorations are usually dots and circles or the herring-bone impressions produced by rubbing twisted cords over the soft clay. In the Buganda and Bunyoro districts I found the most developed methods of polishing pottery, and the Banyoro alone use graphite to give their pottery a silvery grey appearance. Bark-cloth is almost confined to those districts where the tree grew freely, and some of it was dyed with extremely pretty colours. In Bunyoro patterns in black were painted on the natural terra-cotta colour with a black mud obtained from the marshes, but the finest work was done by princesses, who opened a vein and with their own blood painted patterns in triangular shapes. These robes were intended for the king, their brother, whose affections they desired to win.

Carpentering and wood-work was also well advanced in these districts, the finer work being wooden milk-vessels and food-dishes, while they also made drums and canoes for the rivers, the best being the canoes built up of planks cut from trees and stitched together with creepers. These were used on the lakes, especially on Lake Victoria.

A certain amount of skill in the dressing of hides and skins had been attained, for all lion and leopard skins belonged to royalty and had to be dressed until soft and supple. Cow-skins and those of other wild animals were dressed and used as rugs, and by the poorer people for clothing. In no part of Africa have I seen the same skill displayed in dressing the skins of animals as in the Uganda Protectorate. In all cases it is singular to note that industries and arts are confined to the serf class of the community, but distinct progress has been made when these are ruled by the pastoral masters, who keep them to the work.

It is, however, when we study the cults and sociology of the people that we find the greatest help in classifying them. Their gods and fetishes remain when other things change, and we find the same deities in different places under different guises and shapes. I may at once state that my own investigation of nature gods, that is gods of the sun, moon, stars, thunder, lightning, rainbow, and so forth, have never brought to light any developed cult such as I find with hero gods and deified kings.

The nature-gods are worshipped, but at a distance as it were, for in each case there is a medium, either a man or a woman, through whom the people reach the god. As they do not understand his nature, they approach him through a wife, for they think by marrying him to a woman whom they understand that they will obtain their desires through her intercession, though ignorant how directly to approach and worship him. With hero-gods it is different, here we are dealing with the ghosts of fellow-men whose desires and habits are known. From

such a god the medium obtains his directions by means of augury or by direct communication. The fetish is a sacred object which contains the essence and power of the god it represents ; it is usually the horn of some wild animal, the most commonly used being that of the buffalo. The ingredients placed in these horns are known only to a few, who hand on their secret in old age or before death so that the succession of fetish-makers is continued to-day as of old. The horns are often decorated with crystals worked into the plug which fills the end, and among the oldest of the fetishes we find a few stones. The most prized stones seem to have been the round stones with a hole bored through them which are said by some experts to have been the weights for the ends of digging-sticks. When we associate these ideas of stones with the word used for the religion of Buganda, "Lubare," which in some dialects means a stone or rock, with the fact that the emblem of Mukasa, the chief god or god of bounty, was a large stone, perhaps a meteorite, and with the common idea among the people on the north side of the Nile that ghosts enter into the large stones and rocks which they worship, we find ourselves approaching an old and very wide-spread cult which reaches even to the islands of the Pacific.

There is some ground for accepting the theory that the fetishes found on the West Coast of Africa which have assumed human form are a recent introduction adopted in imitation of the crucifixes possessed by the first invaders.

From present knowledge, my feeling is that the Hamitic stock entered the country from some point opposite Arabia to the north-east of Africa, and that from that part migrations took place to the south, south-west, and west.

NOTES ON THE GEOGRAPHICAL FACTORS WHICH CONTROLLED THE SPANISH ADVANCE INTO NORTHERN MEXICO AND SOUTHERN CALIFORNIA.

By L. Rodwell Jones, B.Sc.

(*With Sketch-Maps.*)

Columbus in his four voyages made known the location of the Greater Antilles and the coastal configuration of Northern Panama and Eastern Nicaragua. By 1525 Spain had permanent settlements in Española, Cuba, Jamaica, Porto Rico, and on the mainland in Mexico and Central America. Balboa had exposed the Pacific Ocean, and Spanish sailors had circumnavigated the Gulf of Mexico in their efforts to find a passage to this new-found sea. Stephen Gomez had sailed the Atlantic coast from Nova Scotia to Florida, Cabral had discovered the Brazilian coast, and a Portuguese expedition of which Amerigo Vespucci was pilot had disclosed the southern continent to the La Plata River. Finally the

Portuguese Magellan in the service of Spain had discovered the straits which bear his name and had crossed the Pacific to the Philippines, there to meet his death, leaving the completion of perhaps the most wonderful voyage in history to his comrade Elcano.

Thus in the first quarter of the sixteenth century had Spain some knowledge of the entire eastern coasts of the Americas and of the great ocean which lay beyond. Then and for the next half-century she was pre-eminent in Europe and might have planted her colonies in areas later occupied by the French and the English—probably without serious competition. When these later colonists appeared upon the scene, her power was already waning, and she stood committed to the protection and advancement of her original holdings. She had not then strength enough seriously to contest the Atlantic coast with the English, or the Northern Mississippi plains and the St. Lawrence with the French.

The first landfall of Columbus placed him within easy reach of the larger West Indian islands, and their size and fertility at once attracted the attention of early colonists, while for a period the Lesser Antilles remained neglected. But there was a further reason for this. The warlike and cannibal Caribs of these smaller isles, who inhabited also much of the Caribbean coast of South America, put up a much more serious resistance to Spanish occupation and exploitation than the Arawaks, those meek cultivators of the greater islands and of the Darien coast. Thus the Lesser Antilles received little attention from Spain and fell eventually one after another into the hands of her enemies. The inhabitants of such of them as had been visited by the Spaniard welcomed any who might appear as his enemy.

The accident of early discovery, the size and fertility of the island, the relative weakness of the natives, and above all, the fact that there gold was discovered, all served to make Española the most considerable of the Spanish West Indian possessions. Santo Domingo became the seat of Spanish rule in America. Mining camps, where the alluvial gold was washed in the stream beds, quickly sprang up. Fifteen years after this first settlement, colonies came into being in Porto Rico, Jamaica and Cuba.

It is an error to suppose either that Spain neglected to send colonists to these early settlements, or that when sent they were entirely occupied in the exploitation of the natives in the mines. Bananas, cotton, maize, and tobacco were cultivated before the coming of the Spaniard, and he soon added sugar to the list of staple crops and cattle to the fauna. It is true that the agricultural serf of Spain was not usually among the early colonists and the plantations were largely worked at first by the Indians, and then by imported negro slaves. At first when land was allotted to the Spaniard the forced labour of the native was included in the gift. Then, and partly no doubt from a perfectly sincere desire to better the lot of the native, he was congregated in camps, "protected" against his wish, practically forced to a nominal acceptance of the Spanish faith, and forced also to labour in the fields. Though the

intention was that the native should yet remain in many matters a free man, and should receive pay for his work, the system quickly became one of virtual slavery.

There is evidence of an extraordinarily rapid decrease in the native population, partly no doubt due to the harshness of these new conditions, and partly perhaps to the virulence of European diseases among a people for the first time exposed to their attack. The natives became scarce. The negro was expensive. Plantations ceased to pay. The balance of Spanish power in America was shifted to the richer (in minerals) mainland of Mexico, leaving insufficient forces in Gulf and Caribbean waters either to protect the trade which later had to filter through the network of the Antilles,[1] or to prevent the seizure of the islands themselves by other powers.

Let us turn our attention for a moment to the broad geographical features of this mainland in so far as they affected the problem of Spanish settlement and advance.

Cortez landed near the present town of Vera Cruz, and must have seen before him a low sandy swampy shore, backed immediately by a vivid fringe of tropical forest. The land rises irregularly but rapidly from near the coast, and the great snow-clad peak of Orizaba (18,000 feet high and 70 miles distant) is visible in clear weather from the shore, a reminder of the physical difficulties which confronted all who would gain the central tablelands.

For Mexico consists of a vast highland bordered by even higher ranges. The Western Sierra Madre forms a broad ridge of difficult terrain in parts more than 8000 feet above sea-level and dividing the Sonora province from that of New Mexico; dividing, too, the northern streams of Spanish settlement to these political divisions. The Eastern Sierra is exceedingly steep and difficult about the latitude of Vera Cruz, but diminishes in height as one goes north, giving back so as to form a wider and more perfect coast plain on the Gulf than exists on the Pacific coast. The Southern Mexican tableland, with its temperate, fertile plateau-valleys and considerable populations, suffered always a considerable degree of isolation by reason of its extremely difficult approach either from the west or east coasts; for to the difficulties due to relief were added the dangers of crossing coastal belts of close and fever-ridden tropical forest.

[1] Eventually the Spaniards made use of convoys for their seasonal treasure ships. These normally entered the Caribbean Sea between Tobago and Trinidad and picked up the Northern Andean produce at Cartagena, the terminus of the land route. They then continued to Porto Bello for the Peruvian treasure (which had come by sea to Panama, and thence by mule train across the isthmus), and then to Havana. At Havana the fleet was joined by the galleons from Vera Cruz, laden with Mexican silver. These apparently circled the Gulf in their voyages to Havana, instead of sailing directly, thus avoiding to some extent the contrary trade winds.

The assembled fleet then left Havana and reached the anti-trade wind zone *via* the Strait of Florida. They sought always to leave Havana by mid-September, before the autumn and winter storms. These routes and the constant danger from Dutch and English attack are admirably brought out in T. Gage's *A New Survey of the West Indies*, 1640.

To the far north-east, where so far as relief was concerned access to the plateau was relatively easy, there were broad areas of semi-desert to be crossed. Further, the Gulf coast was almost everywhere fringed by sand-bank and marsh; boats of ten feet draught could seldom approach the shore, and no Gulf Mexican roadstead had shelter against the periodical northers of the winter months.

Detailed maps are required to show the frequently precipitous slopes of some of the southern border ranges, the narrow gorges by which they may be crossed, the obviously volcanic origin of some of the mountain cones, and more important than all, the physically isolated nature, not only of the plateau region as a whole, but of the many separate valley plains within it where alone human settlements are possible. Chief among these is the valley of Mexico City itself, which is some sixty miles long and thirty broad, almost encircled by mountains and—in Cortez' time—largely occupied by shallow swamp-like lakes. In such high valleys the nights are cold. There is a greater difference between sun and shade, and between day and night temperatures, than between those of summer and winter. The surrounding hills, largely treeless, deprive the valleys of precipitation. The rainfall at Vera Cruz is 69 inches, at Mexico 24 inches. Man could perhaps live more healthily than on the steaming tropical coast-lands of the tierra caliente, but nature was less lavish. A greater ingenuity was demanded for the provision of the necessities of existence. Cortez found a people who sheltered themselves from sun and cold in relatively elaborate buildings of sun-baked earth, who eked out the lessened rainfall by using in irrigation works the streams which had their origin in the greater precipitation of the encircling heights. They suffered from a complicated legal and religious system and had all but acquired the art of letters. Cortez was amazed by the art as well as by the value displayed in the presents by which a succession of emissaries of Montezuma sought to buy his retirement.

The comparative isolation of these scattered communities meant a lack of cohesion in Montezuma's overlordship. In considering the extraordinary progress of Cortez we must remember that to the perseverance, shrewdness and imagination which made him so outstanding a personality, was added his good fortune in finding an enemy divided against itself. The isolated and easily defended valley of the Tlascalans had never quite yielded to the dominion of Mexico City, and its inhabitants found the forces of Cortez so formidable that after being defeated by him, they were pleased to give their assistance against the enemy at Mexico. And so also when Cortez himself had mastered the Mexican valley, he had to send out separate expeditions to the semi independent valley states about Lake Chapala in the north-west, to the high valley of Oaxaca in the south-east, and to the upper valley of the River Panuco in the north-east.

In Southern Mexico the Spaniard found concentrated settlements of skilled labour which could be more profitably exploited than the natives of the West Indian islands. A higher social organisation made the exaction

of tribute a possibility. The frequent finding, and more frequently rumoured finds, of the precious metals, encouraged a more rapid survey, conquest and exploitation of the country than would otherwise have occurred. While, and even before, Cortez was engaged in conquering Mexico, other Spanish adventurers were busy about the Gulf of Darien and in the Isthmus of Panama. Here, again, gold was the immediate attraction. The importance of these settlements lay in the fact that they led at once to Balboa's discovery of the Pacific, to the Spanish exploration of the Pacific coast for hundreds of miles to the west and south, and to the discovery of precious metals in the Pacific Cordillera of South America, and eventually in Peru.

In the sixteenth century, then, the activities of Spain in North America were distributed mainly in three distinct geographical areas.

First: The greater islands of the West Indies.

Secondly: The scattered plateau valley settlements of Southern Mexico.

Thirdly: The isthmus region with its minor goldfields, its pearl fisheries, and its important overland route by which the treasures of Peru crossed to an Atlantic port.

Now, with reference to the second of these regions, it will be convenient to examine here the geographical factors which were limiting Spanish influence so largely to *Southern* Mexico, and preventing its extension—in any force—to the present area of the United States, and, in particular, to the Californian valley. The dominating factors here are very simple and can be clearly expressed in Fig. 1. Note first the mean annual rainfall lines, and we see that the whole of the north and much of the central plateau has less than 20 inches of rainfall. A V-shaped drought area exhibits a south-easterly extension almost to the Gulf coast just north of the Rio Grande, and the west coast north of latitude 24° is practically sterile almost to San Diego. The high mountain ranges receive a greater precipitation, sufficient in fact to allow of the crossing of the sterile west coast plain by a number of parallel river courses emptying into the Gulf of California.[1] Much of North-eastern Mexico—Coahuila, for instance—is a sterile area of inland drainage, and abuts on a similar area in the United States of America.

A great belt of aridity then stretched between the more habitable parts of Southern Mexico and regions in the present area of the United States of America where rainfall is sufficient for agriculture. Indeed, such precipitation is hardly met with in the Pacific coast lands until latitudes a little north of San Diego, and in Texas till east of longitude 98°. On the mainland between these coastal limits the general aridity increases somewhat as one goes north to a maximum in Arizona and New Mexico. With regard then to northern advance by land—and, as we

[1] *e.g.* The del Fuerte, Yaqui, and Sonora all cross an exceedingly sterile coast, but though of very varying régimes, these longer rivers do not run dry. See *Mexico* in Admiralty I.D. Publications.

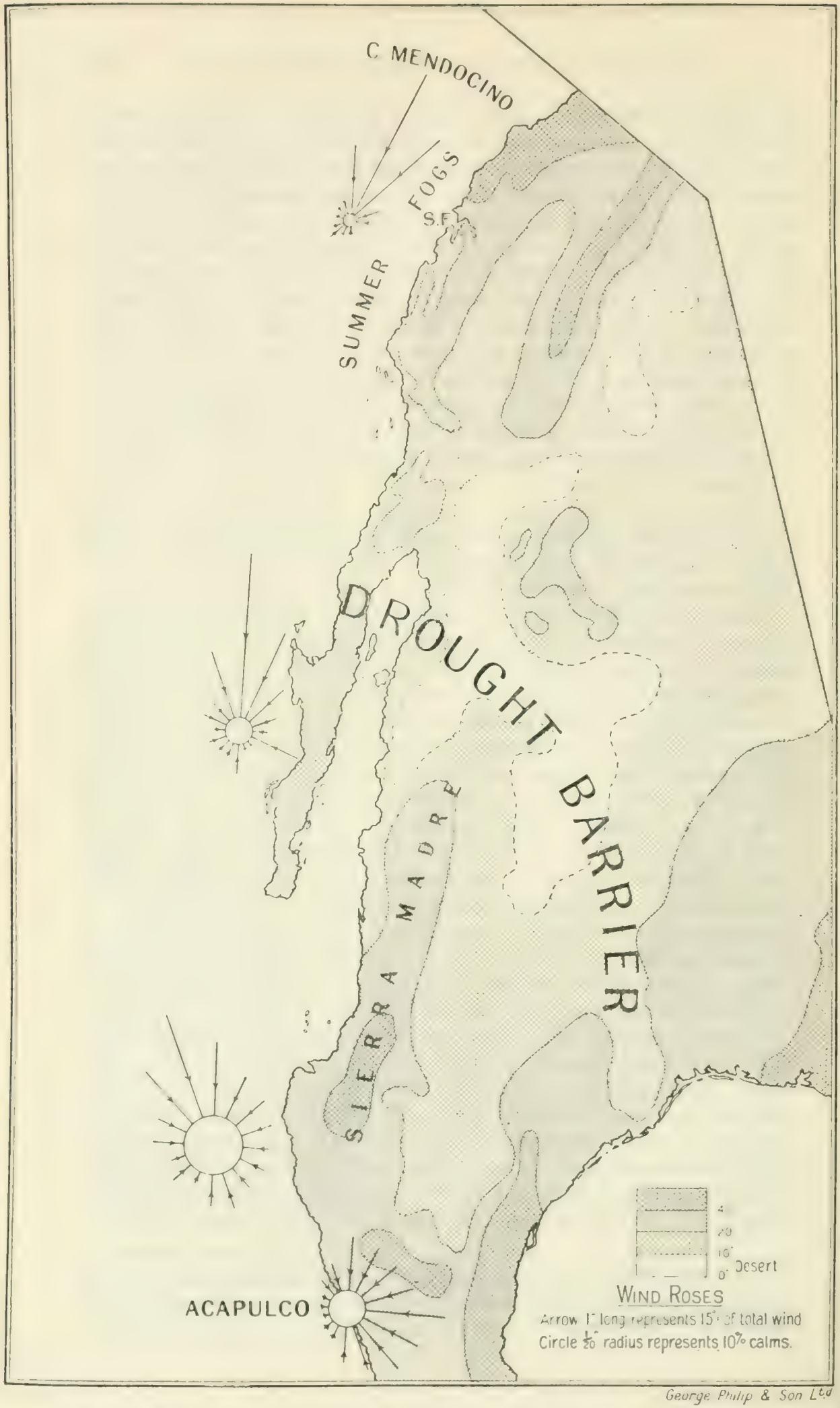

FIG. 1.—The drought barrier between Upper California and Mexico; the rainfall is in inches. The winds adverse to northern voyages are also shown.

shall presently note, this was more considerable than by sea, it had to proceed through a country which, if not actually desert, could support only a small population which was concentrated in (1) scattered settlements dependent upon irrigation ; (2) in mining communities where the great value of the product paid for the difficult transport of supplies ; (3) in cattle ranches.

For the northward-moving Spaniard, this meant increasingly long

FIG. 2.—Mines, villages, and mission settlements in Mexico at the end of 18th century.
- - - roads. ▮ towns, villages, and mission settlements.
+ mines. · cattle ranches.
(From a Map by Arrowsmith, 1790, British Museum.)

journeys between points of possible supply, and supplies which, when obtained, could only support small trains of men. Ever he became more at the mercy of the Indian as his distance increased from the more populous, concentrated, and stable settlements of the south.

The accompanying map (Fig. 2), which should be studied in relation to Fig. 1, shows not only the chief agricultural settlements, the mines and cattle ranches, but also the roads along which northward expansion took place.

Now the motives underlying this northward expansion, though first and foremost we must place the perpetual search for precious metals, included others which varied somewhat with the period concerned. In the days of Cortez the Spaniard had met with so many marvels, so much wealth, and so much military success, that no rumour was too extravagant to be believed. Ever beyond lay fairer cities, more astounding riches. Thus, we have Cortez himself attracted by the rumour of a wonderful *island* of California to the north, of great wealth and inhabited by Amazons. Sure enough his lieutenant, Jiménez, discovered a new land in the peninsula of California, long thought to be an island, and incidentally discovered also an important pearl fishery. But Cortez acquired a more accurate conception of the Lower California peninsula, its climate and its possibilities, when after a few months' suffering, he was obliged to withdraw the little colony which he himself had founded there at La Paz in 1535.

Mexico is notably rich in silver, however, and after much of the accumulated wealth of the southern native settlements had been acquired, the Spaniard organised and superintended labour for such mines[1] as he knew, and was continually prospecting for fresh supplies. Some of the chief mining centres of the eighteenth century are shown in Fig. 2. It will be noticed that they are almost all on the plateau region, which in any case contained the most suitable points for settlement. Fig. 2 represents simply the *location* of mines (not necessarily working for long periods) and of settlements (Spanish and Indian villages and mission stations) at the end of the eighteenth century as shown on a contemporary map. It altogether understates the geographical case, for the tiny mission station of the north is given as much importance as the populous town of the south. Even so a careful examination elicits the following points :—

(*a*) The concentration of population in South Mexican valleys.

(*b*) The unsettled drought area of NE. Mexico and of adjoining U.S.A. territory.

(*c*) The isolation of the Santa Fé mission settlements on the Upper Rio Grande.

(*d*) The way in which the Sierra Madre separate the Central or Santa Fé line of advance from the western coast route.

(*e*) The way in which the early mission stations of California were settled on the moister coast ranges rather than in the dry Great Valley.

(*f*) The desert unsettled area separating these Californian stations from the most northerly Mexican settlements.

In connection with this great mining activity it became necessary to build roads for supplies and a series of fortified settlements to protect

[1] Humboldt in his *Essay on New Spain*, vol. ii. p. 407, emphasises the importance of the presence of the mining centres in the evolution of agricultural centres using irrigation —*cf.* the case of the settlement in the Western States of the United States of America.

the treasure routes. Durango became the chief military centre of the northern area and Guadalajara that of the south-west.

The mines of Zacatecas, Guanajuato, and St. Luis Potosi were among the most famous.

The seventeenth century witnessed in Europe a steady diminution of Spanish prestige. In America it saw the founding of the British tidewater colonies, the French settlements of the St. Lawrence, and that extending line of French forts about the Great Lakes and the confluents of the Upper Mississippi, which were to reach eventually to the Gulf of Mexico. Yet the same century saw a steady advance of the Spanish colonies in Northern Mexico. As has been pointed out, the Spaniard was here more at the mercy of the native, and the initial preparation and control of the latter was handed over to the real vanguard of this latter movement, the Jesuit, and (in the north-east) the Franciscan missionaries. These wonderful pioneers, whom complete faith rendered unmindful of danger, were unappalled by hardships in the pursuance of what they believed to be their duty.

At the beginning of the seventeenth century, they were founding and improving irrigation settlements in the Macarito, Sinaloa, and Fuerte valleys, and in the next three-quarters of a century the valleys of the Mayo, Yaqui, and Sonora were similarly occupied. Their sincere aim was to convert the native, and they could usually show encouraging figures of baptism. Apostasy and rebellion were, however, the usual sequels, and then the Spanish soldiery would appear in force to quell the disturbance. The successive occupation of these parallel western streams was important as representing a zone of northern advance, separated in the main from the corresponding advance on the central tableland, by the difficult ranges which form its western edge. The rainfall was less than on the plateau and settlement was even more definitely limited to the stream beds. It must be emphasised that the actual numbers of Spaniards, of half-castes, and even of the local Indians were very small for so immense an area—chiefly the result of the prevailing aridity. In 1768 (so says Professor Chapman [1]) there were only about 500 families of pure Spanish blood in Sonora, though the half-caste Christian population was much larger.

To the north, then, an increasingly difficult terrain was encountered, and we wonder naturally that a simpler mode of advance was not sought by sea. The geographical factors involved are worthy of some consideration. In the latter half of the sixteenth century, Spain had acquired the ascendancy over Portugal in the Philippines, but her returning galleons were subject to Portuguese piracy on the Cape route, as were her treasure ships in returning from the Gulf. It occurred to some that New Spain would form an excellent base for communication with the Philippines, and Legazpi's expedition of 1565 was undertaken with the avowed purpose of finding a convenient Pacific route. We must note

[1] *The Founding of Spanish California*, by C. E. Chapman, p. 13.

that Southern Mexico and the North Central Philippines are in the same latitude (15 N.) and within the trade wind zone which favoured a direct route across.[1] Return on the same track would have been difficult or impossible, and Legazpi sailed north into the stormy but usually westward-tending wind zone, and so made landfall in Northern California about Cape Mendocino, and then used the prevailing northerly winds along the coast to his South Mexican port. He initiated, that is to say, the sailing route around the normal high pressure belt for the Pacific, as Columbus had done nearly a century before for the Atlantic.

Each year thereafter one or two galleons made the round trip, usually reaching the American coast about Cape Mendocino, and bringing their rich produce eventually to the Acapulco Fair.[2] Long before there were any settlements in what is now the American State of California, its coast was known to the pilots of these galleons.

But the Manilla galleon was making use of the normal winds and currents. To sail from a Western Mexican port *up* the Californian coast was to run counter to them; and that alongside a coast, mountainous, without wood or water, deficient in harbours, and for long stretches uninhabited. The accounts of such early voyages as are recorded clearly illustrate these conditions. Cabrillo in 1542 reached a little to the north of San Francisco Bay, Ferraro went as far north as Cape Blanco. But more interest attaches to the voyage of Vizcaino in 1603, for the reasons for this expedition summarise the general motives underlying Spain's wish to colonise the Pacific coast. Firstly, the extraordinarily long voyage across the Pacific made it advisable to find some good port in Upper California, where the usually rotting and scurvy-ridden Manilla galleons could refit before proceeding to Acapulco. Then, since the audacious appearance of Drake on the Pacific coast in 1579, followed by the Cavendish expedition in 1586—the latter actually burned a returning Manilla galleon (the *Santa Ana*) off California—it was felt that a protective naval station was required on this coast.

Again, though the *eastern* coasts of America were by this time approximately mapped, they were not known in detail, and many gulfs had not been followed to their heads, so that people were slow in abandoning all hope of a passage-way through to the Pacific. The most celebrated of these mythical sea-ways was the Straits of Anian, which should have led to the Pacific somewhere about the latitude of northern California. The Spaniard was anxious to forestall the Dutch and English in the command of this strait.

All these voyages were made with difficulty. Monterey Bay, a poor

[1] The Pacific trade winds are, however, neither so strong nor so regular as those of the Atlantic.

[2] Acapulco is one of the few good harbours on the Pacific coast, and was the Pacific port of Mexico. The arrival of the Manilla galleon gave it a seasonal activity comparable with that (described by Thomas Gage, 1635) occurring at Porto Bello (Panama), when the Spanish convoy galleons called to take up the Peruvian treasure which had crossed the isthmus by mule train from Panama.

harbour, was discovered and explored, likewise San Diego. The magnificent San Francisco Bay was unnoticed on these voyages, as also by the yearly passing Manilla galleons. No settlement was made. The direct trade between Mexico and the Philippines dwindled, and Spain was sufficiently pre-occupied.

The next serious attempt was not made till the late eighteenth century, and we cannot conceive that this would have been so if the physical conditions had been as favourable as they undoubtedly were unfavourable. This expedition of 1769, entrusted to a Spanish governor, one Portola, had rather different aims. The Spanish mission stations had by the end of the seventeenth century reached to Santa Fé on the upper Rio Grande,[1] lat. 35°-40°. Further advance here led only to the mountain plexus of Colorado. On the north-west, however, as we have seen, the Upper Sonora River had been occupied, and it was but natural that advance here should lead to the Santa Pedro and Pueblo Valley tributaries of the Gila, and by the latter river to its junction with the Colorado at Yuma. This adding of the Southern Gila basin to Spanish influence was largely the work of Father Kino, who, beginning in 1687, spent some twenty-five years in mission and exploration work. His journeys convinced him that Lower California was a peninsula and not an island. Meanwhile, the Jesuits, as though to demonstrate that no adverse physical conditions could withstand their missionary zeal, actually planted five small missionary stations on the intensely sterile middle peninsula of California ; but these would have been abandoned if Father Kino had not driven cattle hundreds of miles to the supply depot of Guaymas and shipped them across the Gulf.

In the eighteenth century, Spain, impoverished by her European struggle, was unable to render the military and financial support which her frontier mission stations required, and yet had to see the consolidation of the English in the Atlantic States and the rapid penetration of the French in the Lake and Great Plain regions. To add to her fears, and seemingly, indeed, a more imminent danger, there were the voyages of Bering across the strait which bears his name (1725 and 1740) and the consequent large rush of Russian fur-traders to the Aleutian Isles.

These fears spurred Spain to last despairing efforts. The Portola expedition of 1769 was designed to establish military stations on the bays of San Diego and Monterey. These bays had been visited and explored two hundred years previously, but had not been settled. The expedition consisted of land and sea portions, that by sea being under Captain Vicente Vila, whose diary was recently published in the publications of the Academy of Pacific Coast History.[2] This diary is little more than a log,

[1] The settlements here were mainly mission stations about the river valley. A road is shown on a contemporary map connecting Santa Fé with Mexico City, but even at the end of the eighteenth century the New Mexico Rio Grande settlements were practically separated from the more popular southern area by the Coahuila desert, and its formidable Indians. Humboldt, *Essay on New Spain*, vol. ii. p. 308.

[2] *Diary of Vicente Vila, Sailing Master of the San Carlos*, in publications of Academy of Pacific Coast History.

but it is interesting as giving a detailed exemplification of the difficulties in sailing *north* from any West Mexican port.

Vila took four months to reach San Diego, and as many weeks to return. On the northward journey he hung about for three weeks, while a landing party sought water on the almost desert shores. The winds were northerly and persistently contrary.[1] The land party which had come from the peninsula joined up at San Diego, whence Portola continued north by land, through the Salinas Valley and between the coast ranges to his goal, Monterey Bay. This he failed to recognise—it is indeed a poor harbour—and continued overland to discover accidentally San Francisco Bay. The winter storms off the Californian coast, the almost permanently contrary winds of summer, the sudden storms and rocky islets of the Gulf of California, are perhaps enough to explain, in part at any rate, the curiously long period (two hundred years) which elapsed between some early knowledge of the coast even so far north as Cape Blanco in Oregon, and its ultimate occupation by the Spaniard in the late eighteenth and early nineteenth centuries. Even so, what with the regular passage of the Manilla galleons, and the set expeditions to explore the coast and discover a good harbour, it is an extraordinary thing that the Golden Horn and San Francisco Bay should have first been reached by a land route and then not till 1769. Again, the explanation may be largely geographical. The almost constant (in summer) northerly winds off the five hundred miles of the California coast are accompanied by a markedly cold current. This, however, is limited to a relatively narrow belt of water immediately off shore, so that a hundred miles or so out in the Pacific there is a rapid increase in surface temperature. A movement of warm moist Pacific air towards the land and over this cold belt is accompanied by fogs which shroud the coast, but seldom penetrate into the hot dry interior valley. Summer fogs are as constant off the Californian coast as off Newfoundland itself. We may give these factors a little more definition by the following quotation from the U.S.A. Pilot (*West Coast of Central America Pilot*, 1916, pp. 34-41) :—

"On the coast of California, from lat. 40° north, southwards for 10° or 15°, a wind from NW. nearly parallel to the coast blows pretty steadily during the greater part of the year. . . ."

"Along the coast of Lower California, from lat. 23° to 32°, the wind is generally from between west and north, but during the winter months that coast is subject to violent gales from the SE., which, as most of the bays and anchorages are open towards this quarter, are much dreaded. . . ."

"*Sailing Vessels.*—The only way to make a passage from any part of this coast to the northward is *to stand out to sea on the starboard tack until the variable winds are reached* in about 130° W. and then make northing. From July to January vessels may have to stand on as far as 140 W. . . ."

[1] See Fig. 1.

"*Golden Gate.*—When approaching the entrance *in fine weather* it is *difficult to imagine* that a deep channel lies ahead, so clear is the atmosphere, and so *well defined* the Contra Costa mountains behind the bay."

"*Fogs.*—In the northern part of the coast (California) they are more frequent, and at times are very dense, and have been known to extend several hundred miles seaward. They continue at *times for weeks*, rendering navigation difficult. . . ."

Average number of hours[1] per month, from a record of about nine years that the fog signals were operated at the stated light stations (Point Reyes, near San Francisco) of the U.S.A.

1917								1916				
J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.	Total.
86	179	67	158	96	158	370	326	313	167	70	117	2107

The Yuma massacre (1781) and subsequent trouble with the natives of Northern Mexico made it almost impossible to maintain a regular land connection between Southern Mexico and the string of Spanish mission stations which in the early years of the nineteenth century sprang up and flourished in the *coastal* districts only of California. The southern great valley of California was not at first occupied—it was too dry. But by this time the Pacific was becoming better known to trading vessels. Other European countries began to send their vessels to San Diego, Monterey, and San Francisco—against the law of Spain and of the later Mexican Republic, but with the entire approval of the local settlements. Indeed, it was the physical separation from Mexico in the revolutionary period which allowed these stations to work out their own salvation in comparative peace. Still more was it the fact that at last, after centuries of struggle northwards, the Spaniards had reached a country less forbidding than the vast sterile tracts through which they had passed. The winter rains increase rapidly from San Diego northwards. The raising of crops with and without irrigation was more feasible, and the vast herds of cattle which were the main staple of these settlements could be maintained on much smaller areas.

These most northern mission stations—the Alta California of the Spaniard—throve abundantly. The neophytes were attached to the stations as cultivators, carpenters, weavers, and herdsmen, supplying all the material wants of the stations and preparing a surplus of hides and tallow for foreign trade. They were humanely treated, but remained undeveloped in a system of complete dependence.

Here were the most peaceful and economically successful of Spanish missions, and if—as the contemporary Humboldt states—the monks were averse to white colonists, it was doubly unfortunate, for here at last was a land more suited for agricultural settlement than any the Spaniard had encountered in his sixteen hundred miles of arid track thither from the populous plateau valleys of Southern Mexico.

[1] See "Fog along the Californian Coast" in the *Monthly Weather Review* for October 1917.

THE WEDDELL CENTENARY AND THE PROBLEMS OF ANTARCTICA.[1]

By R. N. Rudmose Brown, D.Sc.

(*With Illustrations.*)

On February 20, 1823, the ship *Jane* of Leith, a brig of some 160 tons, in command of Captain James Weddell, reached lat. 74° 15′ S., long. 34° 16′ 45″ W. in the Antarctic Ocean south of the Atlantic. That was a point 945 miles from the South Pole and three degrees farther south than man had ever previously penetrated. Cook's record of lat. 71° 10′ S., long. 106° 54′ W. was thus eclipsed, and Weddell's farthest south remained the world's record until in 1841 Sir J. C. Ross beat it in the Ross Sea, reaching lat. 78° 4′ S. In the sea that Weddell discovered, the record of this tiny ship of the port of Leith was never exceeded until 1912 when Filchner reached lat. 77° 44′ S. Ross in 1843 fell short of Weddell's record by 200 miles, and Bruce in 1904 failed by 14 miles to make so high a southing.

The remarkable achievement of Captain Weddell marked an epoch in the history of Antarctic exploration by showing one of the roads to the far south. The sea which he discovered—a great bight in the continent—was unsuspected. He called it the "Sea of George the Fourth" and marked it "navigable" on the chart.[2] This name was soon replaced by Weddell's own name.

James Weddell was by birth a Lancashire man, but appears to have lived for many years in Leith and was in later life a F.R.S.E. He was born at Ostend on August 24, 1787, and being left an orphan went to sea at an early age on a Newcastle collier. At the age of eighteen he shipped on a merchant vessel trading to the West Indies, and in this trade continued for three years. Then one day the high-spirited youth appears to have had a difference with his captain and was guilty of the unpardonable offence of knocking him down. Probably the captain deserved it, but still it was mutiny and young Weddell was handed over to the frigate *Rainbow*. Thus the Navy gained a fine seaman. His advancement was rapid: from seaman to midshipman and then master. He was self-educated, using his little free time on board to read navigation, mathematics, and seamanship. Admiral Sir Rose Sartorius, under whom he served, wrote of Weddell: "One of the most efficient and trustworthy officers I have ever met."

[1] Lecture delivered before the Society in Edinburgh on February 22, 1923, in commemoration of the centenary of the southern record of Captain Weddell.

[2] *A Voyage towards the South Pole performed in the Years 1822-24*, James Weddell: London, 1825; Second Edition, 1827. A manuscript biography of Weddell by J. Brown is in the library of the Royal Scottish Geographical Society, which also possesses a painting of the explorer, reproduced on p. 173. The account of Weddell's life in the *Dictionary of National Biography* is largely based on this manuscript.

But Weddell's naval career was to be brief. In 1816 he went on half-pay when the Navy was reduced after the war with France. He was stranded—a master without a ship, and competing with many others in the same position. But he was only twenty-nine years of age. In 1819 he accepted command of the brig *Jane* of Leith for a voyage to the recently discovered sealing-grounds at the South Shetlands. On this voyage he discovered the South Orkneys in December 1821, six days after G. Powell had discovered them. Neither knew of the other's work for long after. These islands were looked on as part of the South Shetlands by Powell, but in the chart based on Powell's scale (Laurie,

Captain James Weddell, R.N.
From a portrait in the possession of the R.S.G.S.

1822) were called Powell Group. The name South Orkneys was Weddell's, and though Powell Group has priority we can scarcely return to it now.

On this voyage Weddell made his first cruise into the Weddell Sea, but he did not recognise it as a distinct sea. He reached lat. 62° 28′ S., long. 52° 00′ W. in the north-western corner.

This was not the first ship that had sailed these waters. In February 1820—that is twenty-two months earlier—Ed. Bransfield, R.N., in the brig *Williams* had reached lat. 64° 50′ S., long. 52° 30′ W., that is $2\frac{1}{4}^{\circ}$ farther south than Weddell on his first attempt. There Bransfield was stopped by ice. It was earlier in the same month that Bransfield had discovered and charted the coast of Trinity Land—the first discovery of the Antarctic continent. The late Dr. Bruce found an overlooked account

of Bransfield's voyage that gives Bransfield, an Irishman, the priority over the American, Palmer, in discovering Antarctica.[1] Bransfield also discovered Clarence Island. This and Elephant Island are called Powell Group by Nördenskjöld—but this is not a very appropriate use of Powell's name.

Weddell returned from his first voyage in 1821. He had acquired a taste for exploration and caught the fascination of polar seas.

In 1822 he again turned south, now as part owner of the *Jane* of Leith, and accompanied by the cutter *Beaufoy* of London, of only 65 tons, under Matthew Brisbane. This was the voyage that was to immortalise Weddell and bring fame to the little vessel from Leith. The *Jane* and *Beaufoy* were provisioned for two years. Weddell's scientific bent was shown in the great care he paid to the selection of trustworthy nautical instruments—an unusual care on the part of a sealing captain. The *Jane* had 22 men and *Beaufoy* 13 all told. The two vessels, after a leisurely voyage, reached the South Orkneys in January 1823. Here some surveys were made in ignorance of Powell's work. One supplemented the other, but both were rough ; they claimed to be no more. Many years later, when the *Scotia* wintered at the South Orkneys, we learned to appreciate Weddell's work even if its defects were obvious.

Weddell here secured a specimen of an unknown seal and preserved a skin. The type and only specimen of the Weddell seal, or Weddell's false sea-leopard, was for long in the Royal Scottish Museum. Now this reptilian caricature has been dismantled and its place taken by specimens from the *Scotia* presented by Dr. Bruce.

Near Cape Dundas, the eastern cape, Weddell reported a "patch of short grass." I searched in vain for that grass in 1903, and think that Weddell must have mistaken a luxuriant lichen (*Usnea*) for grass.

The *Jane* and *Beaufoy* left the South Orkneys in search of new sealing grounds. A reward of £10 was offered to the man who first saw land, but all claims (and there were many) were disallowed on close examination. The ships dipped southward to about lat. 65° S., and then returned on account of ice and stood eastward. Practically on the meridian of 30 W. Weddell turned south on his momentous voyage. He was not without misgivings. Weddell writes that his men suffered from "colds, agues, and rheumatism," as a result of constantly wet decks and living quarters. Provisions were not exactly scarce, but in view of the uncertain length of the voyage they had to be used with care. The allowances per man were : five pounds of bread, two pints of flour, three of peas, and two of barley per week ; $1\frac{1}{4}$ lb. beef or pork per day, and three wine glasses of rum per day. Warm clothing was scarce ; there was little fuel on board, and the ships were not specially protected for ice.

1 "The Weddell Sea: an Historical Retrospect," W. S. Bruce, *Scot. Geog. Magazine*, June 1917. (The following misprint should be noted: on page 251, line 12, for 1822 read 1821.) This paper contains full bibliographical references to the Weddell Sea.

The lure of possible rich sealing-grounds appealed to his crew, paid largely by commission on skins, but Weddell himself was clearly attracted by the desire to add to knowledge. He regretted that he had so few scientific instruments on board, for "my attention was naturally roused to observe any phenomena that might be considered interesting to science." He took air and sea temperatures daily until an accident deprived him of his two thermometers. He had four excellent chronometers, so that his positions are beyond criticism.

Pack-ice offered little obstacle to Weddell's progress, although in lat. 68° 28′ S., long. 29° 43′ W., "Ice islands were so numerous as almost to prevent one passing." For fifty miles there were seldom fewer than sixty in sight. Other expeditions too have found this congestion of icebergs in these latitudes. A berg discoloured with rock waste deceived him on one occasion, and he made for it expecting land, but was disappointed. It prompted him to push on, as he argued that land could not be far off.

On February 18, in lat. 73°, there was not a particle of ice in view. Whales were numerous and blue petrels very abundant.

On February 20 the atmosphere was very clear and nothing like land was to be seen. Four icebergs were in sight: on one were many penguins. A strong south wind impeded progress in that direction. "I would willingly have explored the S.W. quarter, but taking into consideration the lateness of the season . . . I could not determine otherwise than to take advantage of this favourable wind for returning." So in lat. 74° 15′ S., long. 34° 16′ W., he put about. The British colours were hoisted on the *Jane* and *Beaufoy*, and the sea was named after King George IV. A salute was fired, grog served to all hands, and cheers were given for the King.

We need not trace Weddell's return *via* South Georgia, his surveys and adventures in Fuegia and the South Shetlands. His great work of exploration was done. Weddell does not appear to have returned to the Antarctic. For several years he remained at sea in merchantmen, but he cannot have had great success in trading, for he died in London in straitened circumstances in September 1834 at the early age of forty-seven. What was the later history of the *Jane* of Leith I have not been able to discover.

The significance of Weddell's discovery was twofold. First, he dispelled the gloomy forebodings of Cook, who, baffled by pack-ice in his attempts to push south, believed that the regions around the Southern Pole would always remain sealed up in ice, unknown to man. And, secondly, Weddell found an inviting route that suggested an easy line of access to the far south and perhaps to the Pole.

Weddell did not reach the continent. Another hundred miles on his course and he would probably have sighted it; while, if he had turned south-west, as he was inclined, it is not unlikely that he would have been caught in pack, and by drifting to destruction have discovered the dangerous nature of the Weddell Sea. Both these discoveries were

Brig *Jane* and cutter *Beaufoy* in lat. 74° 15′ S., returning northward Feb. 20, 1823.
(From Weddell's *Voyage towards the South Pole.*)

made by Bruce in the *Scotia*, but not till eighty years later. Weddell noted the westerly trend of the current in the far south, but probably did not realise its significance.

There appears to have been another sealer in the Weddell Sea the same year, B. Morrell. Morrell, who wrote an account of his voyage,[1] has generally been discredited. Certainly he was wrong in some of his statements, and clearly his chronometers were faulty. Probably he had little skill in observation. But Morrell no doubt has come in for a greater share of abuse than he merits. Bruce, with his wonted chivalry towards fellow-explorers, tried to defend Morrell's reputation, and even if he did not make a strong case, at least refuted some of the arguments levelled against Morrell's veracity. New South Greenland, the land along whose coast Morrell said that he was sealing, certainly does not exist in the position he reported, but that does not disprove Morrell's voyage into the Weddell Sea.

Other explorers essayed to follow Weddell's route. D'Urville in 1838 met the pack in lat. 63° 39′ S., long. 44° 47′ W., and turned back. He tried too far to the west, and he seems to have been discouraged easily. Then in 1843 came that great Scotsman, Sir J. Clark Ross, in the *Erebus* and the *Terror*. Thwarted in the west of the Weddell Sea, Ross held well to the east and made his sounding. He reached lat. 71° 30′ S., long. 14° 51′ W. There he had a narrow escape of being beset and smashed in the pack that barred his way. This was only forty miles from land, but he saw nothing in the thick weather.

Ross's voyage was the last voyage into the Weddell Sea in the nineteenth century, except for Larsen's attempt to push south in the neighbourhood of Graham Land, in the extreme north-west of the sea. In 1893 Larsen reached about lat. 68° S., when pack forced a retreat.

Although Ross added little to our knowledge of the Weddell Sea—his Antarctic work was principally in the Ross Sea—his expedition had one curious result. It made cartographers represent the hypothetical area of the Weddell Sea very much larger than it really is. His sounding of 4000 fathoms no bottom in lat. 68° 32′ S., long. 12° 49′ W., was the only sounding in this part of the Antarctic Ocean, and it led Sir John Murray, in drawing his probable outline of Antarctica, to extend the Weddell Sea to about lat. 82° S., and include a great area over 3000 fathoms.

Sixty years after Ross, and eighty years after Weddell, another Scottish vessel penetrated the southern waters of the Weddell Sea—not a Leith ship this time, but a Glasgow one—the *Scotia*, flying the flag of the Royal Northern Yacht Club.

It was natural that Bruce should select an unexplored sea for his route to the south. The traditional interest of Edinburgh in oceanography found expression in his generation in Bruce. From the days

[1] *A Narrative of Four Voyages to the South Sea, etc., from the Years 1822-1831.* By B. Morrell. New York, 1832.

when he and Mr. W. G. Burn Murdoch touched the Weddell Sea in the Dundee whalers Bruce had found a lure in those waters.

Bruce's discovery of Coats Land in lat. 74° S., long. 20° W., and his revision of Ross's sounding of 1000 fathoms no bottom to 2660 fathoms, greatly restricted the Weddell Sea both in area and depth. The discoveries of Filchner in 1912 and Shackleton in 1915 continued Coats Land to the south west, and put a southern limit to the Weddell Sea in about lat. 78° S. But Shackleton really increased the area of the Weddell Sea again by the final removal from the map of the great peninsula of New South Greenland.

Between the Foyn Coast of Graham Land in long. 62° W. and the Leopold Coast of Coats Land in long 36° W. nothing is known of the coast-line of Antarctica. Another gap exists on the east of the Weddell Sea, where from the Bruce Coast of Coats Land in 20° W. the coast is unknown so far as Enderby Land in 50° E.[1]

The *Quest* unfortunately added nothing to our knowledge of the course of the Antarctic coast-line. It merely confirmed, by shoaling soundings, what had previously been deduced from the distribution of pack by Bellingshausen and Biscoe as to the presence of land. The *Quest*'s vain attempt to push south was really in the Biscoe Sea and not in the Weddell Sea.

Weddell must have chanced upon an exceptional year in 1823. No later explorer has found the sea so free of ice, but all have found the eastern side to be the line of advance. To a great extent that is true of all Antarctic seas. The circulation of ice in the Weddell Sea, which depends on the winds, leads to ice congestion in the west throughout the year, and to dangerous pressure on that side. The *Scotia* was caught, but by Robertson's skill escaped uninjured; the *Deutschland* was caught, and drifted, but eventually was released; the *Endurance* was caught and crushed. It is most unlikely that the west coast of the Weddell Sea will be charted from the sea. That is why Morrell's landing is so improbable, even if we admit that 1823 was an exceptional year. Sledge expeditions from Oscar Land or Coats Land will be needed to supply this missing coast-line.

Coats Land is ice-covered, and appears to be very lofty in the far interior. We know nothing of its structure. The Germans saw several exposed nunataks fifteen to thirty miles from the Leopold Coast, but did not reach them. Rock fragments, dredged off the coast, are mainly granite, basalt, grey grit, and some rare bits of sandstone that suggest the Beacon sandstone so characteristic of the plateau of Victoria Land.

In all probability Coats Land, beneath its ice-cap, is of the same

[1] The writer has suggested elsewhere (*Geographical Journal*, Feb. 1923, p. 132) that the name Coats Land should be employed, as Shackleton did, for all the land in the south-east of the Weddell Sea, and that the different discoveries should be designated Coasts: Leopold Coast (Filchner), Caird Coast (Shackleton), and Bruce Coast for the part that Bruce discovered. This nomenclature would obviate the multiplicity of Lands, and worthily commemorate Bruce's great discovery.

structure as Victoria Land. The narrow continental shelf of Coats Land confirms this probability by indicating that the edge of the land is the faulted edge of a plateau. The same applies to all lands examined in the Australian quadrant.

Victoria Land, it will be remembered, has proved to be a great ice-capped plateau 6,000-11,000 feet in altitude, bounded along the Ross Sea by a great horst 13,000-15,000 feet high and 50 to 100 miles wide. The horst, lying between parallel faults, makes a great mountain range over 1500 miles in length, which extends into the Maud Mountains that pass the Pole a degree or two on its Pacific side. Transverse faults form great valleys by which the ice-cap flows to the Ross Sea. Folds are entirely absent in plateau and horst.

The horst is capped with the horizontal layers of Beacon sandstone, probably of Ordovician age. Beneath is a peneplain of ancient crystalline rocks. This crystalline peneplain appears to underlie the ice-cap of the plateau; it has been recognised in Adelie Land and Mary Land. Edward Land is probably similar. The Norwegians found granite and diorite in Scott's Nunatak.

A volcanic zone lies along the eastern fault of the horst. The western fault shows no volcanic zone.

Graham Land, south of South America, shows a striking contrast. It has a totally different structure. Mesozoic strata are folded from east to west. In relief, structure, and petrology these Antarctic Andes bear a striking resemblance to the Andes of South America. So close is the likeness that there can be no doubt that the two continents were connected at one time. The link was probably *via* the South Orkneys, South Sandwich Group, and South Georgia, by the so-called Southern Antilles, but this we cannot say with certainty. There are no rocks, so far revealed, on any of those islands that give definite evidence of the existence of the Southern Antilles.[1]

This problem can be solved by further geological explorations and by more soundings, but it is not truly an Antarctic problem.

I have pointed out that we know nothing of the west coast of the Weddell Sea except in the extreme north. We know that the Antarctic Andes of Graham Land skirt the Bellingshausen Sea for some distance, but does a branch skirt the Weddell Sea? Probably not. The floor of the Weddell Sea in the south-west has been found by soundings to be terraced, and no doubt faulted, at right angles to the probable coast-line. This is a strong suggestion of the plateau structure of the unknown land. Apart from the discovery of the missing coast-line, the great problem of Antarctic discovery is the mystery of the structure of the continent. There is little doubt that it is a continent of some five million square miles, in

[1] "Geological Observations in the Weddell Sea Area," J. M. Wordie, *Trans. Roy. Soc. Edin.*, liii. 2, 1921, and references quoted therein. See also "Physical Conditions of the Weddell Sea," R. C. Mossman, *Geog. Journal*, Dec. 1916, and various volumes of *Scientific Results of Voyage of S.Y. "Scotia."*

any case considerably bigger than Australia or Europe—but the relation between the two contrasted types of structure is an unsolved problem. Certainly the plateau structure covers the greater part of the continent and was probably once continuous with Australia, but what are its relations with the Andean structure of Graham Land?

There are three suggested solutions:—

1. Bruce suggested that the Antarctic horst is continuous with the Graham Land Andes. Sir Douglas Mawson and Sir Edgeworth David are inclined to support this view. It is possible that the line of weakness that resulted in the folding of the strata of Graham Land might have resolved itself, in the hard resistent plateau, into a line of great faults. On the other hand, there is said to be definite evidence on the east of Graham Land and some evidence on the west of great parallel faults.
2. The second suggestion is that the Victoria horst and the Maud Mountains swing round to Coats Land and that the Antarctic Andes continue through Edward Land and were once connected with New Zealand. In other words, that the typical Pacific coast-line is continued from New Zealand *via* Antarctica to America. One objection to this view is that Coats Land shows no signs of a horst like Victoria Land, but the horst may die out towards the Atlantic, so that this is not an insuperable objection. This is Professor Penck's view, and he further postulated an Antarctic strait between the two unequal land masses. The Ross Barrier was supposed to be the frozen Australian end of this strait. This theory never had much to support it, and was totally demolished by Amundsen's discovery of Carmen Land. This proves the Ross Barrier to be land-locked on south and east. The German discovery of the Weddell Barrier cannot resuscitate the idea of a strait. But even if the strait disappears, the suggestion of the relationship of East and West Antarctica may possibly be true.
3. The third suggestion is that the whole of the continent except the Antarctic Andes is an unfolded plateau, that a great horst crosses this plateau from Victoria Land to the unknown region south-west of the Weddell Sea, and that the Andean folds of Graham Land merely skirt this plateau and pass north of Edward Land through some undiscovered low land or islands on their way to New Zealand: in fact, that the Andean folding of the Pacific failed to penetrate the old Archaean shield of Antarctica and simply skirted its Pacific edge. There would appear to be some such unknown islands in the position indicated, for something holds the pack on the north of Edward Land and on the east of the Ross Sea.

Only further exploration can solve these riddles. Our knowledge of the Antarctic is still very imperfect, but it has made great strides

since Weddell with rare courage and foresight showed one of the ways to the south.

[The structure of Antarctica is discussed in numerous papers. Reference may be made to the following, but the list is far from exhaustive and indicates only the main source of the theories outlined: *British Antarctic Expedition, 1907-9*; *Report on Scien. Invest.*, Geology i., T. W. E. David (1914); the views of Prof. A. Penck in *Zeit. d. Gesell. f. Erd.*, 1910, 3, and this *Magazine*, May 1910; the views of Dr. W. S. Bruce in "Bathymetrical Survey of South Atlantic Ocean and Weddell Sea," in *Scot. Geog. Mag.*, Aug. 1905, and "Ueber die Fortsetzung des Antarktischen Festlandes, etc," Scottish Oceanographical Lab., 1910. All these papers contain maps.]

THE WADE MAPS AND OTHER ADDITIONS TO THE SOCIETY'S COLLECTION.

By H. R. G. Inglis.

The acquisition of what are now called the "Wade Maps" marks an epoch in the Royal Scottish Geographical Society's National Collection of Old Maps of Scotland, for they are manuscripts of the first importance, and it is hoped that they are the precursors of many others that will find their way into the custody of the Society for the benefit of research workers.

The "Wade Maps," which were acquired through the generosity of a member, are a remarkable collection of Manuscript Maps, which at first glance seemed to have no special connection with one another: but when it was found that the dedication of one of them coincided with the date of Wade's appointment, and the Plans of three Forts were those of which he was appointed Governor, the significance and unity of the whole collection at once became apparent.

General Wade, as he is now known, was appointed Commander of the Forces in Scotland in 1724, and the Barracks at Ruthven (Kingussie), Fort William, Killywhymen (Fort Augustus), and Inverness were isolated stations with no roads of any kind leading to them. Wade therefore set out to connect up these places with military roads, and in this collection of Manuscript Maps we seem to have some remnant of the plans he had before him, both for these and for the improvement of the Forts. In addition to the plan of Fort William was one for the extension of the original "Fort George" at Inverness (not the Fort George of to-day), while no less than five gave alternative schemes for improving the Barracks, or building a new Fort Augustus.

The General Maps of Scotland include one on which are marked in pencil the names and the positions of the various clans, as well as the number of men each could muster. Another shows in colour the roads Wade was constructing through the mountains from Perth to Ruthven Barracks, to join up the isolated Forts at Fort William, Fort

Augustus, and Inverness. Another, evidently drawn by an officer in the Fort William Garrison, "pricked out" on a map, which he says is not drawn to scale, the route to be followed in going from Fort William to Inveraray, and from Fort William to Stirling. A fourth is a surveyor's report—evidently one of the military "Guides"—describing in great detail the condition of the existing track between Callander and Fort William, from which it is apparent that a "carte" could go as far as Tyndrum, and after that it was only a horse track, good in dry weather. We learn now quite definitely that Glencoe was on the main highway to Fort William, and Loch Leven was crossed at Callert, and that General Wade's road over the Devil's Staircase to Kinlochleven was an entirely new road which must have been constructed much later, probably about 1747.

Another interesting map, by Joseph Avery, dated 1735, is the plan for a road over the Grampians from Ruthven Barracks, at Kingussie, to Braemar, with remarks on the country and notes of the span of the bridges necessary for each river. When we recall that Wade only finished his Crieff to Fort Augustus road in 1735, it is at once evident that we have here the plan of the next road he intended to construct, which was abandoned when he thought the clans had quietened down.

The finest map in the collection is, however, the large map of the Moray Firth, giving the country from Elgin round by Inverness to Dunrobin Castle. The details are drawn in most minutely, even to the sandhills on the coast near Culbin Sands. The style of writing is identical with that of the map of the road to Braemar, so that we can almost assume it was by Avery.

Among the odd contents of the Portfolio is what now turns out to be the oldest known plan of Gowrie House, Perth, pulled down in 1805, and it shows the turning of the stair where the "conspiracy" is said to have taken place. There are also quite a number of old plans of Edinburgh, including a fine copy of Kincaid's Map, of which the Society did not possess a copy hitherto, and an interesting Feuing Plan of St. James' Square, dated 1773. It is remarkable that the only other known copy of this map is in Oxford.

Other gifts and purchases recently made have now placed the Society in possession of what is probably the finest collection of Maps of Scotland ever known, while the collection of Maps of Edinburgh is absolutely unique. Indeed, so large is the collection that for months past the staff, assisted by Mr. Mathieson, have been cataloguing and arranging the maps, and there are now no less than 185 Maps of Scotland listed prior to 1850, while in the Maps of the City of Edinburgh there are no less than 52 prior to the issue of the Ordnance Survey. Students of topography and place-names have now complete records to work with.

The Society have been helped very much to complete their collection by the gift of Armstrong's Smaller Map of Scotland, and we now only require Cowley's Map of 1735 to complete the series of maps showing the change of outline developed by different surveys.

Other gifts of much interest are a Plan of the Battle of Prestonpans and one of the Battle of Falkirk—both drawn by an officer present at the engagements.

A Sea Atlas by Peter Goos of Amsterdam, 1666, is also an interesting gift, as it shows the soundings of the Thames; and as the Dutch Fleet sailed up the river to Greenwich the year following, in order to attack London, the Dutch must have had good nautical maps to work with.

Another gift that has been of great service to the Society is that of the War Office, who, when clearing out maps useless to them, offered the Society a fine series of large-scale maps, 1770 to 1783, of the Lothians, Berwickshire, Roxburgh, Ayrshire, and Perthshire.

THE BELT OF POLITICAL CHANGE IN EUROPE.

By J. F. Unstead, M.A., D.Sc., Professor of Geography in the University of London.

(*With Map.*)

It is a striking fact that the new states of Europe, those which have gained or regained independent existence during recent years, lie in a relatively narrow belt of country extending across the whole of Europe from the Arctic Sea in the north to the Eastern Mediterranean in the south. As a result of the Great War, Finland, Esthonia, Latvia, Lithuania, Poland, and Czecho-Slovakia have achieved independence, Danzig and Fiume have been formed into small states, Hungary has separated from Austria, and Serbia has developed into the Serb-Croat-Slovene State. Since the Balkan Wars of 1912 and 1913, Albania has become independent, and the remaining states of the belt, Rumania, Bulgaria, and Greece, have had their territories considerably altered; moreover, these latter states, together with Serbia, obtained their independence only during the preceding century.

West of this area, the post-war territorial changes have been slight; east of it a final settlement has not yet been reached, but it appears likely that the whole of European Russia will form a close federation if not a political unit.

Thus a continuous strip of land includes all the recently formed states, and it may be further observed that no part of this strip has been exempt from change. The only exceptions to this statement are formed by two outposts of external dominion still maintained within the territory, namely in the north where Russia reaches the Gulf of Finland by Petrograd and East Prussia remains a part of Germany, and in the south where Turkey retains Constantinople and the adjacent district. These exceptions scarcely impair the continuity of the region to which I apply the term—*the belt of political change* (see Map).

The Belt of Political Change in Europe.

The main object of this paper is to account for the position of the belt and to elucidate its essential characteristics.

It may first be pointed out that from this point of view, Europe may be divided into three parts: (1) the relatively stable west, with about 250 million inhabitants; (2) Russia in the east, with a population of about 100 millions; (3) the central belt of change, with about 100 million people; this central belt therefore has about one-fifth of the inhabitants of Europe and covers an area almost exactly one-fifth of that of the whole continent.

It may also be noted that the new states have been formed mainly by the break-up of three great empires; from the east, the Russian and Turkish dominions stretched across the belt as far as Western Europe, while between them the Austrian power extended from the west as far as the Russian plain. As an exception to this generalisation there are the relatively small ex-German territories and the present enclave of East Prussia, but the German settlements may perhaps be regarded as an intrusion into the belt rather than an extensive occupation of it. Thus it appears that the belt of change is a region caught between east and west, marginal to each and influenced by each. This idea applies both to the physical and to the human conditions.

Let us consider the physical characteristics of the belt in relation to the whole continent. Europe is a peninsula of Asia and its eastern portion resembles and continues Northern Asia in many ways, notably in its flatness, its extreme and dry climate, and the zones of natural vegetation, ranging from tundra through forest and grassland to desert. Structurally Eastern Europe is a stable region little disturbed from Archaean times, and therefore possessing over wide areas a uniformity in its surface conditions. Only where mountain-folding and faulting impinged upon the eastern and southern margins of the Russian platform are there any marked interruptions to communication, and only in the same districts are minerals found to any extent. Even the Urals oppose little barrier to movement; Eastern Europe has always been open to Asiatic influences and migrations.

Western Europe, on the contrary, is essentially maritime: it is penetrated by extensions of the ocean, and its climate is relatively equable and humid. Structurally, it has been influenced by repeated earth movements, from those which in the dawn of the life-period affected the north-western margin to those which in Tertiary times convulsed the Mediterranean region, while the progressive subsidence of the Atlantic area determined the maritime character of the sub-continent. The "Caledonian" and "Mediterranean" lines of disturbance impinging on the Russian platform gave to Western Europe its broadly triangular character. Thus the eastern base of this triangle forms a belt of structural transition coinciding with the belt of physical change.

Because of the repeated disturbances Western Europe has inland seas and intricate structure and relief. These features provide varied resources, maritime, agricultural, and mineral. Into this region spread

the civilisation of the Mediterranean, and here communities found the physical conditions which enabled them to develop. The seas and gulfs due to subsidences, and the highlands and uplands due to uplift and differential erosion, together formed barriers separating the relatively small productive areas sufficiently to give them distinctiveness and individuality. These characters were imposed also upon the groups of people inhabiting the areas, and so in course of time nationalities developed, self-conscious and strongly desiring political freedom. Although at times the nascent states were overwhelmed by a flood of conquest, the recession of the flood allowed them to re-assert their independence; by the nineteenth century the nations had become self-governing, and, broadly speaking, democratic.

These nations were formed by the fusion of people belonging to the three races which may fairly be called "European," viz. Nordic, Alpine, and Mediterranean, and it is to be observed that in the course of many centuries local conditions favoured the fusion of small groups to such an extent that several states exist in which the peoples are of different races and languages, and yet feel themselves to be of one nationality. There is relatively little coincidence of race, language, and nationality in Western Europe.

The culture of the Mediterranean region which spread northwards had its spiritual as well as its material aspects; the Roman Church extended throughout Western Europe, and at the present time the Roman and Protestant faiths are predominant in all the Western states.

Eastern Europe is characterised by its uniformity of structure and relief, with great belts of similar climatic conditions and similar natural vegetation extending through it into Asia, giving opportunity both to the movement of military forces and also to the much slower migration of tribes and peoples, mainly in an east-and-west direction. The early civilisation of the Mediterranean region had an economic basis which would be impossible with the long and severe winters and the poor water supply of Eastern Europe, and the repeated incursions of Asiatic nomads across the southern and warmer portion of the eastern plains prevented the development of the region. From the human, as from the physical point of view, this area was an extension of Asia for many centuries, and had but a scanty population.

It became European by the growth of Russia; the Slavs, who seem to have developed in the region where the central uplands of Europe adjoin the Russian plain, worked their way eastward through the great forests till they extended their power across Asia and finally occupied the grasslands and semi-deserts which lie to the south. The Asiatic population of the European portion, never great, was in part displaced and in part absorbed, so that the Russian Empire was predominantly Slav in language and race; if the census at the end of the nineteenth century can be trusted, there were less than seven million people of Asiatic descent in Eastern Europe. The Eastern, as distinct from the

Roman Church, had spread over the Russian plain, so that the Slav languages and the Greek faith became characteristic of by far the greater part of the region, while the authority of the Czar's government extended over the whole. Thus, with the exception of small settlements in the cold north and the arid south-east, Eastern Europe was characterised by simplicity and uniformity even more marked as regards its peoples than as regards its physical conditions.

The Asiatic intrusions which in earlier centuries swept across the eastern plains were as a rule checked when they reached the relatively narrow region between the Mediterranean and the Baltic Seas, where there is now the belt of political change. In the southern part of this restricted area mountains barred the way, while in the north the Pleistocene glaciation had left a tangle of lakes and marshes in the forests. Here, in the central belt, the force of the invaders was spent; here they found conditions of life alien to their traditions, and when the tribes of the Asiatic grasslands succeeded in conquering the forest-dwellers of Central Europe, they had either to adopt the mode of life of the people they subjugated or to live parasitically upon them. For example, the Bulgars adopted the husbandry of the Southern Slavs, and later some of the Turks did likewise, while others extorted from them the means of livelihood in the guise of rents and taxes or by more obvious forms of pillage. The grasslands of the Plain of Hungary formed an exception to the rule: here the Magyars were long able to remain a pastoral people although no longer nomadic, yet even they extended their power over neighbouring districts where conditions demanded a different economic system.

Further north in the forested central belt, forest-dwellers from Asia were more easily able to keep their traditional methods: moreover, there were few inhabitants in the new country, so that the Finns and Ests should be regarded as settlers rather than conquerors.

These northern peoples are obviously Asiatic in appearance and characteristics, but further south the "race" or "stock" of the conquerors became greatly modified, and in most cases their physical characteristics are now almost indistinguishable from those of the "European" peoples. Nevertheless, the traditions and names of the invading tribes have been preserved, differences of language remain, and very frequently feelings of hostility and memories of conquest separate them from their neighbours.

In this belt of Central Europe there is sufficient variety in relief and surface conditions to produce natural regions of restricted area in which groups of peoples could develop or maintain an individuality, but sufficient time has not yet elapsed since the Asiatic intrusions for a complete fusion of races in the several regions. The Asiatic elements still assert themselves, and Finns, Ests, Magyars, Bulgars and Turks stand out, in one way or another, from the Swedes, Germans, Slavs, Albanians and Greeks of European descent. Moreover, two small groups of the Nordic race, the Letts and Lithuanians, have preserved their identity

from very early times and remain quite distinct from the other Nordic peoples in language and nationality.

In regard to religion, too, there is a marked complexity. Broadly speaking, the northern part of the belt resembles Western Europe in so far as the Roman or the Protestant faith is predominant. In the south the Greek faith is most widely held; in the centre there is much overlapping, and the Uniate Church is of a transitional type. Moreover, the Turks introduced the Mohammedan religion, which still has numerous adherents in the Balkan area. It therefore appears that the belt of political change, although in the centre of Europe, is characterised by a diversity of race, language, religion, and nationality in which Asiatic influences are more significant than in either Eastern or Western Europe.

In this belt, moreover, the self-government of nationalities has not hitherto been able to develop. The autonomous type of political organisation which has grown up in Western Europe here meets the imperial or subjugating type characteristic of the greater part of Eurasia. The Russian Empire extended not only eastward to the Pacific, but also westward till it was checked by the Baltic Sea and the Scandinavian and German Powers; in Central Europe the Austrian dominion grew at the expense of the Slavs, Magyars, and Rumanians; the Turks occupied the whole of the Balkan region.

Thus the present political conditions over the whole of the belt are largely due to the disruption of these three great powers and to the extension of autonomous government to peoples so diverse in origin and characteristics, so often hostile in feeling, and at the same time almost entirely without tradition or training in the art of government. When it is remembered that in the countries of Western Europe, centuries have been necessary for such political education of peoples as now exists, and for the evolution of such systems of democratic government as they now possess, it will be realised that the sudden introduction of western ideals and institutions into the central belt must be accompanied by grave and serious complications.

Certain economic problems of the new states are due to the same causes, for the political units are by no means self-sufficing and their frontiers have become barriers to trade and hindrances to production. The natural routes which lead from one productive area to another, and from these areas to the wider world, have been cut across by the newly formed boundaries, and much time will be needed to overcome the mutual fears and jealousies of the peoples of the belt; meanwhile the attainment of political freedom has been accompanied by a check to production, commerce and prosperity.

It may be remarked that each of the three great empires had its capital on the border of its homeland, and therefore in or adjoining this marginal belt, and in each case the break-up of the empire has involved a loss of prestige or prosperity to the capital city: Petrograd has been displaced by Moscow and its importance has largely disappeared; Vienna has had its political and economic bases shorn away and is struggling for

its existence as a great city ; Constantinople is the seat of the nominal government of Turkey, but at the present time the effective power is in Anatolia.

The political dominance of the three empires was accompanied by the seizure of lands. Russian nobles in the Baltic regions, Austrians in Bohemia, and Turks in the Balkans held considerable territories and reduced many of the native people to the state of labourers or serfs. Moreover, those people of the countries who had maintained or gained the status of peasant proprietors held their land on a tenure which was commonly onerous or precarious. "Land-hunger" became as characteristic of the peoples of this belt as of the peoples of the Russian Plain, and was one of the most important factors in the break-up of the empires. Immediately after the political and military dominance was removed the dispossession of the landlords was accomplished. The new forms of land tenure are various, but on the whole small-holdings have replaced large estates, and the main question is the extent to which the ownership of the small-holdings is to be individualistic or socialistic.

In addition to the possession of land by Russians, Austrians, and Turks, there has been a similar alien ownership by Poles and Magyars. From the two great lowlands of the belt, the Vistula Basin and the Plain of Hungary, these peoples have in the past established political and economic dominion over surrounding districts, so that beyond the territories occupied by the Polish and Magyar peoples there were wide areas in which there were Polish and Magyar landlords. The effect of the Great War has been different in the two cases, however, for while the defeated Magyars have had their new territories reduced to a minimum, the liberated Poles have claimed sovereignty over parts of East Galicia, White Russia and Lithuania, where only a minority of the population are of Polish descent, speech, or sympathy ; the disputes over the eastern boundary of Poland have an economic, as much as a strategic, origin.

The problem of minorities exists, in one form or another, throughout the belt, and is perhaps the greatest menace to future peace. The peoples of the various races have not yet settled down together long enough for local influences to cause their mutual assimilation, particularly as racial and national enmities have been kept alive by repeated conflicts. However wisely the new boundaries had been drawn, even if the principle of self-determination had been everywhere followed, alien groups must have been included in all the new states. Mutual tolerance and fair dealing, the absorption of energies in peaceful occupations, and the satisfaction of material and spiritual needs are the requisites for the fusion of the complex populations of these states.

The problems of the belt of political change are greatly complicated by two eastward movements from the more highly developed states of Western Europe, along the shores of the Baltic and Adriatic Seas respectively. The depressions of the Baltic and Eastern Mediterranean regions have given waterways between east and west which have had

many direct and indirect consequences; trade follows both the coasts of the seas themselves and also the courses of the rivers which (particularly in the south) have been diverted by the subsidences to the seas.

In the north of Europe, German traders long ago set up their stations along the shores of the Baltic Sea and the Gulf of Finland, missionaries and crusading knights accompanied and followed them, and subsequently Teutonic landowners and nobles ruled the native peasants over considerable areas of the interior. Hence have arisen two of the greatest difficulties of this region; those connected with land tenure and those with communications.

The dispossession of the Teutonic landowners and the establishment of a system of peasant-farming in Esthonia and Latvia were two of the first acts of these countries. These are matters of internal administration, while the problem of communications is one of the chief difficulties of the foreign relations of the states of this region.

Poland largely consists of the Vistula Basin, and the lower course of that river is the obvious and necessary outlet of the country. Also the German settlements of East Prussia on the one hand and West Prussia on the other are separated by a belt of Polish occupation along by the river. Yet at the mouth is Danzig, inhabited mainly by Germans and with German organisation of its commerce. The solution of a Polish corridor and a Free City of Danzig is fundamentally just, but sincere co-operation between Germans and Poles will be necessary for the smooth working of the system and the maintenance of efficient communications.

Similarly in the Adriatic region, Italian traders settled on the Dalmatian islands and coasts. Here, however, the mountainous character of the country precluded wide occupation by Italians; there is no great question of Italian land tenure in the interior and the issues are mainly commercial and strategic. The problem of Fiume is somewhat similar to that of Danzig: a Yugo-Slav route in Yugo-Slav country has a port in which Italian traders have settled. There was less justification for the establishment of a Free City of Fiume than for a Free City of Danzig, but the military power of Italy supported the desires of the Italian traders and consequently Yugo-Slavia could not retain the port. As Danzig may be compared with Fiume, so the enclave of East Prussia has its counterpart in the enclave of the city of Zara, now under Italian suzerainty, the much smaller size of the latter corresponding with the smaller lowland areas in the Dalmatian, as compared with the Baltic, region.

The Baltic depression has allowed the sea to penetrate the belt and to give access to Eastern Europe by the Gulf of Finland: here Russia has retained Petrograd and a small piece of coast-line, but the winter freezing of the port makes it necessary for Russian trade to seek an outlet through Esthonia and Latvia. Consequently the relations between these three states are, and will be, largely bound up with problems of means of communication across this part of the belt.

Similarly, in the south of Europe, the subsidence of the Eastern Mediterranean area has allowed the Sea of Marmora, with the Dardanelles and Bosphorus channels, to give access to Eastern Europe. Here again the problem of communications has been, and will be, the dominant one affecting political relations, involving not only Turkey and her immediate neighbours, but also distant states, such as Britain, which have commercial interests in the Black Sea and its hinterlands.

The subsidence in the region of the Sea of Marmora was of such a depth as to give only a narrow waterway between the Mediterranean and Black Seas, so that the land passage between Europe and Asia Minor was not seriously interrupted. Hence there is here a bridge-region, whose utilisation for land traffic is as important as the sea-passage into the Black Sea, particularly to the continental powers in whose economic systems railway communication plays a large part. Germany and Austria adopted the policy of the "Drang nach Osten" through the Balkan region, and were therefore brought into opposition to the Russian policy of predominance in the Black Sea area and the British policy of predominance in the approaches to India.

Thus the unstable political conditions of the belt are increased by the existence of the passages by which East and West can approach one another in the Baltic and Mediterranean regions.

In the central part of the belt the geological past affects the present in quite another manner. Repeated disturbances of the earth's crust in the Bohemian and Carpathian areas have caused the existence and accessibility of mineral deposits, among which coal, iron, salt, and petroleum are the most important. These minerals have attracted the manufacturers and financiers of Western Europe and led to a penetration of the region which is of relatively recent origin and indeed is still in progress.

Examples of this form of penetration are found in the German exploitation of Upper Silesia, in the German and Austrian mining and manufacturing enterprises in Bohemia, and in smaller settlements further to the south-east. In consequence of these developments, the internal politics of Czecho-Slovakia will be complicated by the existence of a large German-speaking minority, while the very difficult problem of the partition of the Upper Silesian region has had its influence not only on the relations between Germany and Poland, but also on the Anglo-French Entente, and indeed on the general co-operation of the Great Powers in their work of reconstructing the economic fabric of society.

The mineral resources in and adjoining the Carpathians and the Transylvanian Alps have been factors affecting the allocation of territory among the states immediately concerned, and since the War they have also drawn capital from Western Europe and thereby increased the interest of the western powers in the region.

To sum up, the belt of political change owes its existence to the fact that it is marginal both to Western and to Eastern Europe, while its political and economic problems are due to the complex character of its

physiography and its population. The Baltic and Mediterranean depressions and the minerals of the central uplands have led to the partial penetration of western influences and so added to the political complications. Stability cannot be attained for a very long time, and meanwhile the relations between the newly formed nations of the belt must be difficult, and their reactions upon Western Europe may be dangerous to the welfare of the whole continent. International co-operation is essential if peace and prosperity are to be secured in the face of the political and economic complexities which are due in large part to the geographical conditions.

GEOGRAPHICAL NOTES.

Europe.

National Collection of Old Maps of Scotland.—With the assistance of Mr. John Mathieson, F.R.S.G.S., F.R.S.E., Hon. Librarian and Map Curator, there has just been completed an MS. catalogue of the maps of Scotland and of the Old Maps, Plans, and Views of Edinburgh in the possession of the Society, which is available for consultation for those interested (cf. p. 182). The catalogue is divided into three parts:—(1) The Maps of Scotland chronologically arranged from the Earliest Times to 1851: (2) Chronological List of Maps and Plans of Edinburgh prior to and including the Ordnance Survey, 1852, with a few of a later date; (3) Views of Edinburgh.

There is also a short list of the books and papers dealing with the old maps of Edinburgh which have been consulted in the compilation of the catalogue, and a note by Mr. Mathieson on the old Scottish mile, a unit used in several of the old maps. There is some doubt about the exact length of this unit, owing to the fact that the length of the Scottish ell varied in different counties: it is given here as 1976·522 yards. Mr. Mathieson has given a scale for each map mentioned in the catalogue on the basis of this conversion. The size of each map is also given.

Africa.

Drought in South Africa.—As is well known, drought is a constantly recurring problem in South Africa. A Drought Investigation Committee in that country started work in 1920, and has published an interim Report, which is given in outline in the *Journal* of the Department of Agriculture, Union of South Africa, vol. 5, 1922. Apart from the immediate economic problem, this Report raises some interesting general questions from the point of view of human geography. The Commission point out that although a large part of South Africa was dry before the arrival of the white man, there is evidence of increasing dryness since his coming. They find no evidence that this is directly

due to diminishing rainfall, though they recognise this as a possibility. The immediate cause, in their opinion, is that the effective rainfall has diminished owing to the denudation of the plant cover. "The rains of last generation fell on unbroken, understocked grazing land, and were more lasting in their beneficial results than rains of equal magnitude falling to-day on veld overstocked, tramped out, semi-waterproof, hard-baked by sun and veld fires." Specific recommendations are made as to changes in methods of stock-keeping which would diminish trampling and concentration of stock. But the point of general geographical interest which emerges seems to us to be that the pastoral industry, when carried on by extensive as contrasted with intensive methods, involves essentially destructive exploitation of the natural vegetation, is, in fact, a mode of "robber economy." Like all forms of robber economy it tends to be short-lived, for it destroys the natural balance upon which it depends. It seems, therefore, that it is not necessary, as has often been done, to postulate marked climatic changes to account for the migrations of pastoral peoples in the earlier days of history. Such movements may originate in a season or successive seasons of extreme drought, but it is not necessary to regard that drought as the sole cause, which should rather be sought in the cumulative effects of mismanagement of grazing lands, and the progressive decrease in the "economic value" of the annual rainfall.

General.

The late Dr. W. S. Bruce.—It will be recalled that in his will the late Dr. W. S. Bruce directed that after cremation his ashes should be scattered in the South Atlantic Ocean in a high southern latitude, preferably between long. 10° and 15° E., in order to call attention to the need for oceanographical researches in those seas. While it was impossible to carry out these wishes literally, an opportunity was found to conform with their spirit. In January last the ashes left Leith for South Georgia on the s.s. *Coronda*, by kind permission of Messrs. Salvesen of Leith. A letter was sent, at the same time, to the Resident Magistrate on the island asking him to scatter the ashes at sea. News has been received recently from Mr. E. B. Binnie, the Magistrate on South Georgia, that the ceremony was duly performed. On Easter Monday, April 2, Mr. Binnie went to sea in the whale-catcher s.s. *Symra*, accompanied by several of his officers and the manager of Messrs. Salvesen's whaling station. They had no sooner cleared the land than a strong wind set in from the north, raising a heavy sea. The *Symra*, however, was kept on her course to the north-east for some miles. At length the vessel's head was turned into the wind in order that the deck might be left moderately dry for the ceremony. The flag was flying at half-mast. Mr. Binnie addressed those present on Dr. Bruce's work as an explorer of the Arctic and Antarctic, and explained his last wishes. The ashes were then scattered in the sea and the vessel returned to port.

The ceremony took place approximately in lat. 54° S. long. 36° W., a part of the Southern Ocean that has never been oceanographically surveyed.

We are also informed that at a meeting of subscribers to the Bruce Memorial held on May 12, a Bruce Memorial Prize was founded, and it was decided that the Prize should take the form of a bronze medal and a money award, to be given for notable contributions to natural science in the nature of new knowledge, resulting from personal visits to polar regions. The Prize is open to workers of all nationalities, with a preference for those of Scottish birth or origin. Further particulars will be available later.

Shackleton Memorial Fund.—The attention of members is drawn to the circular in regard to the Shackleton Memorial Fund which is enclosed in this issue of the *Magazine*. In view of the former connection of Sir Ernest Shackleton with the Society it is hoped that the response of members to the appeal contained in the circular will be generous. Any subscriptions from members should be sent to the Secretary of the Royal Scottish Geographical Society at the Society's Rooms in Edinburgh.

Royal Geographical Society's Awards.—The Founder's Medal of the Royal Geographical Society has been awarded to Mr. Knud Rasmussen for his exploration and research in the Arctic regions during the last twenty-five years; the Patron's Medal to the Hon. Miles Staniforth Cater Smith for his explorations in the unknown interior of Papua; the Murchison Grant to Capt. A. G. Stigand for his map of Ngamiland; the Back Grant to Mr. B. Glanvill Corney for his studies in the historical geography of the Pacific; the Cuthbert Peek Grant to Messrs. R. A. Frazer and N. E. Odell to assist them in continuing their exploration of Spitsbergen; and the Gill Memorial to Capt. Augieras for his journey in 1920-21 from Algiers to Mauritania.

Economic Geography.

Mineral Resources of Canada.—Dr. J. B. Tyrrell took as the subject of his presidential address to Section M. of the American Association for the Advancement of Science last December "Mining in Canada," and this address appears in *Science* for January 12. Dr. Tyrrell points out the steady progress which has been made in Canadian mining, especially since the opening of the C.P.R. from sea to sea in 1885. It is, however, a remarkable fact that despite the developments which have made Canada into an important mining country, the mines now being worked are all situated in or not far beyond the confines of the southern border belt, the vast country beyond yielding practically nothing. Thus, here are found the nickel copper mines of Sudbury, the chief source of the nickel supply of the world; the rich silver mines of

Cobalt; the great gold mines of Porcupine and Kirkland Lake in Northern Ontario, the output of which has now raised Canada to the position of third among the gold-producing countries of the world, after South Africa and the United States. Other important deposits are the asbestos mines of Quebec, the source of most of the world's supply of asbestos; the coal mines of Nova Scotia and Alberta, the latter of which have undergone great developments in recent years, so that in 1920 this province produced more coal than any other in the Dominion; and the coal, copper, lead, and gold mines of British Columbia. The Porcupine and Kirkland Lake mines were first worked in 1910, but one of the mines is on a portage which had been used for a century or more by fur-traders. If the value of deposits within fairly easy reach was thus so long in being realised, it is probable that the larger tracts of unknown country contains vast and as yet unsuspected resources.

EDUCATIONAL.

Lecturership in Geography at Edinburgh University.—Mr. Alan Grant Ogilvie, M.A., B.Sc., O.B.E., has been appointed Lecturer in Geography at Edinburgh University, as from 1st October next, in succession to Mr. Geo. G. Chisholm, whose retirement at the end of the current session was announced in our January issue (p. 44). Mr. Ogilvie has been recently engaged in research work in connection with the American Geographical Society of New York.

Summer School of Geography.—We are informed that courses in geography will be held in Cambridge from July 31 to August 17, and will include lectures, demonstrations, field work in surveying, and some excursions. Application should be made to the Rev. Dr. Crange, Syndicate Buildings, Cambridge.

NEW BOOKS.

EUROPE.

Russia To-day and To-morrow. By Paul N. Millukov. London: Macmillan and Co., Ltd., 1922. *Price 9s. net.*

This volume is mainly based upon a course of lectures delivered in the autumn of 1921 at the Lowell Institute, Boston, U.S.A., by the author, a prominent member of the Russian Constitutional-Democratic Party. "Yesterday" might very well have been included in the title of the book, for Mr. Millukov traces the course of events in his troubled country onwards from the late Czar's Manifesto of October 1905. In the opening pages of the first chapter is sketched the state of Russia at that period. The country was obviously ripe for that revolution which "always becomes unavoidable when important and vital reforms are impeded by an authority which has lost its moral prestige and has become powerless to suppress a growing and universal disaffection among the masses."

We are then shown the reasons why the Bolsheviks obtained control, stress being laid on the fact that, while the Revolution of March 1917 was of a "national" character, the more serious catastrophe of the following November was Communist in aim: "a revolution not for Russia's sake, but for the sake of world revolution." Mr. Millukov points out how natural, Russia being in the state it was, was the collapse of her great armies at the front: the private soldier, hearing that the land for which he hungered was at last being portioned out among the peasants, had no thought but one—to hasten home to take his share. Later chapters deal in considerable detail with the *régime* and policy, both home and foreign, of the Bolshevik dictators; with Bolshevism in decline; with the 1921 famine; and finally with Russia's contributions to the culture of the world in music, literature, and art. The troubles of the anti-Bolsheviks are also described, and Mr. Millukov may be excused for showing some trace of bitterness when treating of the failure of the Allies—Britain included—to afford effective help: quite naturally he hardly grasps in full the troubles on our side. In "Russia To-morrow" the author takes a hopeful view of his country's future. He foresees the approaching total extinction of Bolshevism. The people have ceased to expect the promised world-revolution; they see that the working-classes of France, Britain, Germany, have all rejected that proposed millennium, and are showing patience under difficulties, and confidence in their rulers. Russia, he thinks, will in the end work out her own salvation. The country may have "fallen deep; but it has not fallen from a very high level. That is why it has not hurt itself so much in its collapse as would be the case with a more advanced country." The book is an informing one.

The Peaks of Shala. By Rose Wilder Lane. London: Chapman and Dodd, 1922. *Price* 12*s.* 6*d.*

This very readable volume gives a graphic picture of the hill tribes of Northern Albania. Finding herself in Scutari, the author joined two American girls in a visit paid to the Shala district with the purpose of establishing schools. The ladies, escorted by gendarmes, were accompanied by a twelve year-old boy named Rexh pronounced Redge) and by Rrok Perolli, Albanian Minister of the Interior. His presence, wholly unofficial, had its risks, as the tribes visited were hostile to the Government. The route lay over almost perpendicular mountain ranges, down and across the beds of torrents swollen by the heavy rains. Great is Albanian courtesy to unexpected guests. One household, finding Rexh to be Mohammedan and so unable to eat pork, delayed the evening meal for several hours, sending a messenger across the hills to the next village to procure some other meat. This had its irritating side, the evening meal being frequently not served till the small hours of the morning: while Perolli would reprovingly inform the hungry ladies that it was impolite to appear eager for food or to partake of it too freely. These hill tribes of Albania are a law unto themselves: or rather they acknowledge no control but the old tribal law of Lek, with the binding authority of the Besa or Oath of Honour. Children are frequently betrothed before their birth; there is implicit belief in the Ora, spirit of the woods and hills; the sun is saluted at its rising and setting, while its image is not seldom graven with the cross upon the tombstones of the dead. "Go on a smooth trail" is the charming phrase with which the parting guest is sped. The limit of the journey was the village of Thethis, where Perolli's identity was accidentally discovered and he was for several hours in dire peril of his life. The local chief decided in his favour—further hinting that he was prepared to pay him twenty thousand kronen if a marriage could be brought about between himself—the chief—and Mrs. Lane! Pathetic was

the obvious eagerness of these untutored people for instruction. Padre Marjan, the priest of Thethis, taught his small pupils with no better educational appliance than a piece of chalk with which he scrawled upon the walls of an unfurnished room ; a cake of soap, brought from two hundred miles away, was the first prize. The Bishop of Pultit had tears in his eyes when asking Mrs. Lane if she could send him a little writing-paper and a few pencils ; two copy-books and a small quantity of ink formed his entire store. The book, illustrated by photographs, a map, and panorama of the Shala peaks, is well worth reading.

The English Village : The Origin and Decay of its Community. By H Peake, F.S A London : Benn Brothers, Ltd., 1922. *Price* 15*s.*

This volume, as its sub-title indicates, traces the village community in England from its beginning down to the present, and ends with a forecast of the future village. In the nature of things the earlier chapters must be largely speculative, but one would like fuller proof for some of the statements made. On what evidence, for instance, does the author base his opinion as to the gradual diminution of the Nordic element in Greece (p. 60), to take only one example ? The dates, too, of prehistoric man's movements are given with a definiteness and assurance which are surely hardly justified by archaeological research. It would be interesting, too, to know whether aerial photography had been used at all in the examination of sites of valley and moorland villages. The section of the book which deals with the period from the arrival of the Saxons onwards is of special interest and value, and is illustrated by most helpful maps and plans The first agrarian revolution is compressed into a single chapter, and yet one has rarely come across a clearer treatment of the movement. Human geographers will welcome the attention given to the form of the village in the latter part of the book. What the future has in store for the village community we cannot tell, but one would be glad to know that local authorities were at least provided with an account of Mr. Peake's ideals for it. In a future edition it might be possible to indicate the localities shown in maps and plans, and to devise a more convenient method of giving authorities for statements made.

ASIA.

Indian Images. Part 1. The Brahmanic Iconography, based on Genetic, Comparative and Synthetic Principles. By Brindavan C. Bhattacharya, M.A., F.R.S.G.S. (Edin.), Professor, Benares Hindu University, etc. Calcutta and Simla : Thacker, Spink and Co., 1921.

One welcomes systematic study of any of the many Indian questions calling out for patient unbiassed research. Professor Bhattacharya has here set before himself a twofold aim, viz. (1) to cull from the early Sanscrit religious works all the passages bearing upon the images of the gods, and (2) to describe a large number of typical *earlier* images as these may be seen in museums or *in situ* in North India. Thirty full-page illustrations of these images are given. The title "Indian Images" is rather misleading, especially for those who wish to know about the images worshipped in India *to-day*. The descriptions and the picture of the goddess Kali, for example, suggest nothing of the long protruding red tongue of the Kali images common in Bengal to-day. It is questionable also whether there is any gain for the student in including in the Iconography the comparatively modern rationalisings of the several features of the images. To return to Kali for illustration. The black figure of the goddess, her foot upon a white human figure lying prostrate on the ground, symbolises, according to Professor Bhattacharya,

"the darkness which enveloped the universe in the time of creation." The accepted historical explanation, on the other hand, may be read in the Government of India's "Census Report, Calcutta, 1901." Black Kali, the Report says, is an "aboriginal goddess," "absorbed into the Hindu pantheon," and she represents the conflict between the dark aborigines and the whiter Aryan invaders, by trampling triumphantly upon "the white *Aryan* prostrate at her feet."

The Handbook of Palestine. Edited by HARRY CHARLES LUKE, B.Litt., M.A., and EDWARD KEITH ROACH. With an Introduction by The Right Honourable Sir HERBERT SAMUEL, P.C., G.B.E., High Commissioner for Palestine. London: Macmillan and Co., 1922. *Price* 12*s.*

This volume is called a Handbook, which suggests something rather dry and technical, but much of the information is given in a most interesting fashion. It begins with a geographical section describing the coastal plain, the plateau region near the hills of Galilee, and the hills of Samaria, and then the desert, and the Jordan valley with its curious chain of lakes. A short history of Palestine follows, from early days when it was inhabited by a Semitic people, through Biblical times, to the Crusades. Mention is made of the Mameluke and Turkish rule and the invasion by the great Napoleon, and so on to the coming of the British, and the Military Administration of 1917-20.

There is an interesting chapter on "Peoples and Religions," and the statistics given for 1922 are worth noting. There were then in Palestine 583,188 Moslems, 84,559 Christians, and 79,293 Jews, which shows how enormously the Moslem population still preponderates. It is noted that there are 28 Government schools for boys with an attendance of 14,000 boys, and 190 village schools, mostly for boys. There are 23 girls' schools attended by about 2800 girls.

The section devoted to tourists is excellent and gives full information on all the points which usually harass intending travellers. There is also a good list of books, and the volume should prove invaluable to travellers in the country.

British North Borneo: An Account of its History, Resources, and Native Tribes. By OWEN RUTTER, F.R.G.S. Pp. xvi+404. London: Constable and Co. Ltd., 1922. *Price* 21*s.*

British North Borneo has been fortunate in securing Owen Rutter to tell its tale. He has in the way of duty traversed practically all the area under the administration of the British North Borneo Company, and has kept his eyes and his ears open and his intelligence working. Nothing of interest seems to have escaped him, and he has judiciously selected his material so that those who wish to become acquainted with this little known but fascinating region can do so within the compass of 400 pages. His style of writing, with here and there a poetic touch, carries the reader irresistibly along.

Borneo's dealings with the white man began in the sixteenth century, previous to which the island had paid tribute at intervals to China. Pigafetta, Magellan's historian, first described the island and gave it its name. It was not till 1773 that a trading settlement under the East India Company was established on the island of Balambangan, but the Company shortly afterwards withdrew and piracy and chaos flourished. In 1881 the British North Borneo Company was founded, and administered its territory till 1920, when it determined to take an active share in the industrial development of the country. In 1888 the region, 31,106 square miles in extent, was created a British Protectorate. To quote from Sir West Ridgeway's introduction: "Forty years ago the country was a tropical wilderness, untilled, uncared for, utterly neglected. To-day it is the scene of patient toil and

industry. Numerous rubber and tobacco estates are scattered throughout the territory, and its valuable timber and coal resources are being exploited." In connection with the timber resources, Mr. Rutter says that "at present there is no fear, so great is their abundance, of the Borneo forests being extinguished," a heartening statement in view of the shortness of furniture woods and woods for general purposes.

The advancement of the territory under the Company's guidance may be illustrated. In 1883 the revenue was £13,679, while expenditure was £51,995; in 1920, the revenue and expenditure were respectively £425,334 and £215,224. In 1883 imports were valued at £80,422; exports at £29,836; the figures for 1920 were respectively £1,284,438 and £1,405,722. Comment is needless. Communication is being attended to as rapidly as possible. There are now 125 miles of railway and 500 miles of bridle-paths, and the Company is seriously tackling the problem of metalled-road construction. Great water highways are formed by the rivers Labuk, Sugut, Kinabatangan, and Segama, while the port of call between Australia and China is Sandakan.

It would carry this notice to an inordinate length to detail the wealth of information to be acquired from a perusal of the volume. Whether the author is descanting on punitive expeditions, jungle travel, the life of a district officer, camphor, edible birds' nests, collecting honeycomb, coco-nuts, sago, Borneo leeches, Dusun houses, or the beliefs and habits of the natives, he is always more than readable. A sample of his power may be given. Sandakan's "streets are always busy and alive with all sorts and conditions of men. Chinese, from wealthy merchants in European clothes to coolies with no clothes at all save a battered hat and a waist-cloth of brilliant red; Malays in coloured *sarong* and round velvet caps; stalwart Sikh policemen in khaki uniforms and Pathans with legs as thin as sugar-canes; olive-skinned Dyaks, Arab traders with distinguished noses and shifty eyes, and Philippinos with beautifully laundered suits; Japanese ladies in bright kimonos; Dusuns from the jungle; Javanese from the estates; Indians; and—most picturesque—Sulus with coloured head-cloths, long tight breeches, and closely fitting embroidered coats, purple, orange, or deep blue, often besprinkled with sequins and fastened with thirty-four tiny buttons of silver-gilt."

The book is handsomely illustrated and is furnished with a very full bibliography.

Arabia. By D. G. Hogarth. Oxford: At the Clarendon Press, 1922. *Price* 7*s.* 6*d. net.*

Dr. Hogarth has given us in the space of 130 pages or so an admirable summary of the history of Arabia. It will be of great service to those who desire to understand the rather complicated political state of the peninsula. Geographical conditions seem to have played but a small part in Arabian politics, for in the past Arabia has been several times more united than it is at present. An index and a sketch-map at the end give a useful guide to the text.

The Heart of Arabia: A Record of Travel and Adventure. By H. St. J. B. Philby, C.I.E., I.C.S., etc. In Two Volumes. London: Constable and Co., Ltd., 1922. *Price* 63*s.*

Towards the close of the War Mr. Philby was appointed Political Officer of a British Mission to Riyadh, the Wahhabi capital of Arabia. For various reasons the other members of the mission did not travel, and for nearly a year Mr. Philby was the sole representative of Great Britain in the heart of Arabia. This entailed a prolonged residence in Riyadh, a journey across Arabia to Taïf and Jidda and

back, and other excursions. By good fortune, and with the consent of Ibn Sa'ud, the Wahhabi ruler, Mr. Philby was enabled to make a special journey southwards to Dam, not far from the northern edge of the Hadramaut, thus traversing a region known in part from the travels of Palgrave, but largely from information gathered at second hand. This was Mr. Philby's most notable achievement, and forms his chief contribution to the clearing up of the mystery of South Central Arabia.

In this connection Mr. Philby comes into open conflict with the late Gifford Palgrave. When Mr. Philby visited the Aflaj province from Riyadh he was prepared to be guided by Palgrave's description, but he found that description so utterly at variance with what he himself saw that he was forced to the conclusion that Palgrave had never visited Aflaj at all. Mr. Philby expressed this conclusion in a paper before the Royal Geographical Society in 1919, and was challenged by Dr. Hogarth. He then examined Palgrave's accounts of journeys in other parts of Arabia with which he was acquainted, and found, to take one example (vol. ii. p. 121 : "In every section of the journey within my ken Palgrave may be convicted of the grossest errors, the cumulative effect of which is overwhelming. . . ." And the conclusion, after an elaborate and detailed argument (vol ii. p. 155), is : "We are free to wonder, not whether Palgrave made a flying excursion to the Aflaj, but how much he really did see of Inner Arabia." Here we may let the matter rest for the present, but it is well to note that Mr. Philby's wholesale condemnation of Palgrave only throws into brighter contrast his whole-hearted admiration of Doughty (vol. ii. p. 119) : "With the perversity characteristic of mortal man I searched that narrative [*Arabia Deserta*] for flaws and found it flawless."

The volumes are excellently produced, plentifully illustrated, and are agreeable to handle. The index is adequate, and the work contains two maps from surveys by the author, and a plan of Riyadh.

From Golden Gate to Golden Sun. By HERMANN NORDEN. London : H. F. and G. Witherby, 1923. *Price* 15*s. net.*

Into the East. By RICHARD CURLE. London : Macmillan and Co., Ltd., 1923. *Price* 10*s.* 6*d. net.*

Malaya. Edited by R. O. WINSTEDT, M.A., D. Litt. (Oxon). London : Constable and Co., Ltd., 1923. *Price* 12*s. net.*

There are those to whom books dealing with the East are ever welcome, in whatever numbers they may come ; and for such, each of the three before us has its value, although varying in degree and kind. For Mr. Norden's volume it appears we are indebted to a happy chance. The author's purpose was to visit the South Seas ; when, missing his boat through the attractions of a farewell dinner at San Francisco, he accepted the situation with philosophy and decided to steer instead for North Borneo, Sarawak, Malaya, Siam, and Sumatra. The result for lovers of these lands, too little known, too little understood, is an eminently readable and illuminative book. First comes a trip into the interior of Sarawak ; followed by a speedy run from Singapore and across the Malay Peninsula to the Siamese frontier. Chapter iv., perhaps one of the best in a volume where not a page should be missed, describes life in the jungle as lived by the man in charge of a lumber camp, sole ruler of five hundred coolies and two hundred working elephants. "Noah," as the author christened his friend on account of the river house-boat which formed his headquarters, shifted his dwelling up or down stream as the areas of timber to be felled demanded. The coolies, with their wives and families, dwelt in tree-huts raised thirty feet above the ground, thus securing immunity from the danger of panthers, snakes, and the occasional tiger. The working elephants, freed from their gear by beat of drum at "knocking-off time,"

foraged for their food in the surrounding jungle, footboys following their tracks and bringing them to work. The felling was done, well and neatly, with the native axe, the coolies declining to use the American implement and being quite helpless with a saw. By the way, when "Noah" told Mr. Norden that "if an elephant lies down he is sick. He sleeps standing and with his ears wagging," it is to be presumed that he was speaking of tamed elephants or perhaps of his own special gang. That the Malayan elephant frequently takes his noon siesta prone upon the ground, or reclining against such a support as a convenient ant-hill, is a fact well known to many a hunter in the Peninsula. From Siam, of which Mr. Norden has much of interest to say, he passed to Sumatra, concluding with a tour of inspection round some Indian Ocean lighthouses. On the island of Nias, where civilisation has a somewhat uncertain hold on savagedom, horses were formerly unknown. A chief summed up the first imported pony as follows: "Kuda (horse) bad ghost. Too wise. Two tails: one on neck, one behind. Tuan gets on Kuda's back, and Kuda knows where Tuan wants to go." Lack of space forbids us to do more than recommend the chapters dealing with the highlands of Sumatra, especially that describing the matriarchal system of family life existing among the Menang-kabau Malays. The book is illustrated, and provided with a map which shows the author's route.

Mr. Curle's volume, descriptive of a comparatively recent tour in Burmah and the Malay Peninsula, is commended in a preface by Joseph Conrad. Mr. Conrad should know a deserving book when he sees it, and we are far from saying that *Into the East* is not good. But it might, in our opinion, have been better had Mr. Curle indulged less freely in a strain of introspective would-be philosophising. He gives us far too much which is "decidedly extraneous"—he himself supplies the phrase. This is a pity, for he can describe extremely well: can make his reader visualise the scene he paints. In the chapter "A Rubber Plantation," for instance, he has quite a score of touches, light, swift, deft, which help to fix the picture in our mind. Consequently we began "On a Malayan Balcony" with pleasant hopes —only to find no picture at all, but some reflections upon men and women, novels, life in general, which might just as well have been set down while waiting in a London barber's shop. Moreover, Mr. Curle is too fond of the first person singular. This fact grew on us gradually, till, having reached page 152, we were roused to count the "I's," and found no less than eight within as many lines. And yet the book is not one to neglect. We gather that much of its contents has already appeared in various periodicals, from the *Times* to the *Blue Peter*.

Malaya is a book of a different class and purpose from the two travel-volumes already noticed. Under the editorial control of Mr. Winstedt of the Malayan Civil Service have been enlisted several experts whose contributions on their special subjects form a highly valuable and entirely up-to-date work on the Straits Settlements and the Malay States, both Federated and Unfederated. The book is very welcome and most timely. Malaya has advanced so rapidly within the last few years, the changes in its government and in the general mode of life have been so great, that even books by such incomparable writers as Sir Hugh Clifford and Sir Frank Swettenham—two men who knew and understood, if any men understood, the "soul" of a most fascinating race and land—have grown to be, though still delightful, slightly out of date for those who wish to know Malaya as it is to-day. The volume now before us will go far to set the reader right. Physical features, scenery and climate; native races, history, language and literature; antiquities, arts and crafts, commerce and industries: these, with yet other sections, have their place. Personally we confess to some disappointment with the brevity of the sections dealing with the flora and fauna, and should have welcomed

much more detail on the rubber industry. But we frankly confess to an appetite insatiable for things Malayan, and to a longing for a Malay encyclopædia which should rival the *Britannica* in size. Meanwhile *Malaya* is a volume to be bought, not borrowed, and its place should be upon a shelf quite close at hand. It is liberally illustrated.

AMERICA.

The Golden River: Sport and Travel in Paraguay. By J. W. Hills and Ianthe Dunbar. London: Philip Allan and Co., 1922. *Price* 10*s.* 6*d.*

The falls of Iguazú and Guayra are still little enough known to enable us to welcome a description of them, and especially a description so pleasantly written as that in this book. No photographs of Guayra seem to have been taken, but those reproduced of Iguazú are most striking, and they give an excellent idea of the magnificent falls. The main object of the journey was fishing, and we are given a spirited account of struggles with the dorado, the mighty fish of the Parana. The book concludes with a visit to the Chaco, and a chapter on its birds. Our only quarrel with the authors is that we should have enjoyed a book of double the size more than twice as much.

AUSTRALASIA.

The Making of the British Empire: The Making of Australasia: A Brief History of the Origin and Development of the British Dominions in the South Pacific. By Thomas Dunbabin, B.A. London: A. and C. Black, Ltd., 1922. *Price* 10*s.* 6*d.*

This series promises to be of very great value to geographers and to the general public. Every page of this first volume shows that Mr. Dunbabin's ability to do justice to such a subject is beyond dispute. He has sifted masses of material in his research work, and, in addition to verifying more or less known facts, has discovered new facts from material which has only recently become available for investigation. These he has strung into a scholarly and readable story which constitutes a great storehouse of information, and the book should be read by all interested in the exploration side of geography, as well as by those who wish to have the most up-to-date knowledge about this vast portion of the British Empire. In marshalling his facts, the author has taken care not to overload his narrative with petty details, and has seen to it that a broad outlook has been maintained. Naturally the development of Australia bulks most largely in the book, but ample justice is done to New Zealand and Tasmania.

It is worth noting in connection with the discovery of Australia that a French map of 1542 indicates that the East Coast of Australia was known then, but apparently it had not again been visited till Captain Cook rediscovered it. The first English vessel to appear in Australian waters was wrecked on a reef N.W. of Dirk Hartog Island in 1622. From 1644 when Tasman finished his second voyage till 1770 the map of Australasia remained practically as it had been charted by various Dutch navigators. "There was no immediate movement to occupy the land of which Cook had taken possession. For a moment it seemed likely that the French might anticipate the English. In 1772 the French were busy at each end of Australia. According to the MS. log of his voyage preserved in the Paris Archives, and never yet published, Saint Allouran followed the coast of Western Australia from the Leeuwin to Shark Bay, where, on March 30, 1772, he took formal possession of the land for France and hoisted the French flag." Much has been done to open up our southern dominion, but "even in 1921 there

was a stretch of several hundreds of miles of broken coast in North-Western Australia which had never been accurately surveyed."

Some other facts may be given. It is almost incredible that "from 1788 to 1867, when the system was finally abolished, 137,161 persons were transported from the British Isles to Australia." All these convicts were not hopelessly degenerate, for Flinders "selected nine to make up his crew" when engaged in exploring the coast of Australia in the *Investigator*. Sturt was accompanied by eight when he voyaged down the Murray in 1830. Hume and Howell, Sir Thomas Mitchell, and other explorers were also well served by convicts. In other capacities they showed their worth, and the progress of Australia is to some extent due to these broken men and women.

In 1850 the first railway from Sydney to Goulburn was begun; West Australia obtained her transcontinental railway in 1917, when the 1063 miles from Kalgoorlie to Port Augusta were opened for traffic.

But probably the story of the unearthing of gold is the most romantic of all. "Nothing that the world has seen before or since has quite equalled the Victorian gold-digging. In the ten years 1851-1860, the diggings yielded 23,931,718 ounces of gold worth £80,000,000. Some diggers made wonderful finds. In one week-end at Ballarat, ten miners took £10,000 worth of gold from a claim. It was no wonder that the plough rusted in the furrows, the sheep strayed without a shepherd, that seamen left their ships, shopkeepers their shops, officials and police their duties to rush to the diggings. From 1852 to 1856 inclusive, the population of Victoria was multiplied more than fourfold, rising to 336,957."

The Pacific is now fringed with nations which are likely to have a determining influence on world politics, and in view of that fact Mr. Dunbabin's work is well worth perusal.

Northmost Australia. By Robert Logan Jack, LL.D. In Two Vols. London: Simpkin, Marshall, Hamilton, Kent and Co., 1921. *Price* 63*s. net.*

These two handsome volumes form a most valuable contribution to the history of exploration in and around Cape York Peninsula. The period covered by this history ranges over three centuries and dates from about 1607, when the Spanish navigator Torres cleared the passage separating New Guinea from Australia, named afterwards the Torres Strait by Dalrymple. A pathetic interest attaches to these volumes, for the author died when they were passing through the press.

In writing this history Dr. Jack set himself a laborious task, for which he was well equipped by previous training and experience. He began his scientific career in 1867 as a member of the Geological Survey staff in Scotland, and during his ten years' service he established a reputation for producing work of a high order in the field and in the official publications. He, however, developed a decided bent towards exploration in other lands, which he expressed to the writer during a joint traverse in the Eastern Carpathians in search of evidence of the former extension of glaciers in that region.

His aim was realised in 1877, when he entered on his duties as Government Geologist for Queensland. He vacated this post in 1899 to lead an exploring expedition in Korea and China, which was forced by the Boxer rising through the Upper Yangtse gorges and the mountains dividing China from Burma, the results being published in his volume, the *Back-Blocks of China*. Ultimately he returned to Australia as consulting geologist and mining engineer.

Towards the close of his career he prepared the materials embodied in this history. He studied the narratives of all explorers by sea and land in the light of modern charting, and submitted their records and his own to rigid scrutiny, making

corrections where necessary with fuller knowledge. The volumes contain many original or hitherto unpublished documents, numerous portraits chiefly of explorers and prospectors, and fifteen specially prepared maps showing the routes of the successive expeditions and occasional geological notes. In describing the achievements of the pioneers the work grew in his hands, for what was begun as a history of Cape York Peninsula came to include Torres Strait, the Gulf of Carpentaria country west to the boundary of Queensland, and the Pacific country as far south as Bowen.

The accounts of the various expeditions teem with interest, largely owing to the impartial analysis of the results by the author and the literary skill with which the materials are presented. It appears that in the early days international jealousy led to the concealment of important advances in exploration. This trait is shown in the treatment of the question of the insularity of New Guinea, which was known to the Spanish and Portuguese, denied by the Dutch, and proved by Torres, but the proof was kept secret for a long time! In 1770 the question was definitely settled by Cook, who, after sailing north along the Pacific coast, discovered a channel through the strait distinct from that used by Torres.

Special interest attaches to the explorations made by Cook; Flinders, who was the first to circumnavigate Australia; Kennedy, whose expedition ended so disastrously; the Jardine brothers, who first contributed real knowledge of the western interior of Cape York Peninsula; and Hann, whose report added largely to the geographical knowledge of the region, and led to important economic developments through the discovery of gold and an immense area of "good country" suitable for pastoral occupation. Generous reference is made to the valuable work done by Richard Daintree, who acted for a short time (1868-70) as Government Geologist for the northern division of Queensland. His "Notes on the Geology of the Colony of Queensland," communicated to the Geological Society of London in 1871, based on reconnaissance work in the field, show his remarkable grasp of the relations of the rocks in the southern part of the peninsula.

At this stage (1865-72) the population of the region steadily increased through the discovery of gold in widely separated localities. The goldfield of the Palmer River and its tributaries may be cited as an example: it yielded five and a half millions sterling in a few years, but the field was soon exhausted.

A large part of the second volume is devoted to Dr. Jack's explorations in 1879-80, which extended northwards along the eastern coastal ranges as far as Somerset near Cape York. Accompanied by prospectors he was instructed to hunt for auriferous country like the goldfield of the Palmer River, but, as he himself states, his explorations did not add to the material wealth of Queensland. He suggests that this result was partly due to the great development of the "Desert Sandstone" which concealed the gold-bearing rocks. On the other hand, he added largely to our knowledge of the physical geography; he charted extensive areas, naming important hill ranges and some of the streams that drain them. His observations threw much light on the geological structure of the northern part of the peninsula. His work in the field was hampered by the hostility of the natives, who sometimes followed his movements stealthily. On one occasion he was speared by a native a little above the shoulder-blade, but, although it proved to be merely a flesh wound, the shock to his nervous system was considerable. Had he chosen to adopt strong measures such an attack might have been prevented, but he was reluctant to pick a quarrel.

The prominent part which Dr. Jack took in establishing artesian wells in Western Queensland, which have done so much for the prosperity of the colony, deserves special mention. A few years after his arrival there he inferred from the

geological structure of the country that a supply of artesian water might be obtained by boring. A trial bore was sunk to a depth of 1645 feet, which discharged water at the rate of 291,000 gallons per day. The uprise of this subterranean supply has given rise to considerable discussion. Professor J. W. Gregory has maintained that it is due to gas and rock pressure, and that some of the water is of plutonic origin.

In the concluding chapter Dr. Jack adopts a pessimistic view of the gradual civilisation of the aborigines. He states that the peninsula "is thinly peopled by a feeble folk inevitably doomed to vanish from the face of the earth within the current century. Fair dealing, kindness, philanthropy, and Christianity alike have proved their inability to stay the operation of a natural law, mysterious and deplorable though the law may be." In his opinion, the only course open is to guard the strait and wait patiently for the arrival of whites from the south.

JOHN HORNE.

POLAR.

Among Unknown Eskimo. By JULIAN W. BILBY, F.R.G.S. London: Seeley, Service and Co., Ltd., 1923. *Price* 21*s.*

There is something very attractive about this book, quite apart from its geographical value. The author genuinely admires and likes the Eskimo of Baffin Land about whom he writes, and he has had twelve years' experience of them, so that he can understand and sympathise with the pleasures and hardships of their lives.

Baffin Land was discovered in 1615 by William Baffin. It is wholly an arctic country, mountainous or hilly and barren, but has one peculiarity, namely, huge lakes high up on the mountains, and in these "salmon trout abound." How they got there is an unsolved mystery. Coal is known to exist at Cape Durban, and plumbago has been found in various places. The flora is arctic. Rough grass, reindeer moss, and red and white heather grow freely. A small yellow poppy (*Papaver radicatum*) and a small purple saxifrage (*Saxifraga oppositifolia*) are also found.

The inhabitants belong to the purest Eskimo stock now known, for they have mixed less with the foreigner than other tribes have done. In character they are full of curious contradictions. For instance, they eat raw flesh and live in many ways like animals, but they are far from being savages. They are keen and expert hunters, but peace-loving, and seldom fight among themselves. They are a most hospitable people and share everything with each other, or the passing stranger. They all help to build the snow village in winter. They are very good to their children, and are also especially kind to the old, the maimed, and the helpless.

The sled dog is a great asset in Eskimo life. Its education begins when it is about six weeks old. The children harness it to a small sled and train it. A little later it is placed in a team of older dogs and obliged to work. All dogs have to wear a protection for their feet, and the puppy's first offence is generally "eating his boots," an act which results in such sore feet that it is seldom repeated. The Baffin land dogs are fed entirely on seal flesh. The chief animals in and around the island are bears, wolves, foxes, reindeer, hares, lemming, grampus, and seals. The author incidentally mentions many interesting facts and anecdotes about these animals and their ways. For instance, the mother seal deposits her young one in a snow cavern above the ice. Both bears and foxes are partial to young seal, so the bear when he sniffs out one of these caverns gives a mighty heave with his paws, and pushes away the snow. The fox is too light for this method, so he places all four paws together and spins round and round in the snow, till like a corkscrew he arrives at his booty.

The book gives a very vivid picture of the Baffin land Eskimo and their life, and it is very interesting and entertaining reading.

GENERAL.

Scottish Colonial Schemes: 1620-1686. By George Pratt Insh, M.A., D.Litt. Glasgow: Maclehose, Jackson, and Co., 1922. *Price* 12*s.* 6*d. net.*

The story of these enterprises is not a cheerful one, but Dr. Insh's spirited writing will carry many readers through it. He has made what might have been a dull and dismal book much the reverse.

It is not strange that at the start the Scottish Colonies were failures. The genius of the Scottish adventurer was moulded on centuries of fighting in the Continental wars. Nor was the Scot a seafarer. When at last an effort was made to follow the lead of England and in 1621 a Charter under the Great Seal was granted to Sir William Alexander "to procure a forraine Plantation"—the Nova Scotia of to-day—the venture was short-lived. In 1632 it passed into French hands. Lord Ochiltree's settlement on the Cape Breton Coast in 1629 was also in French hands before many months were past. The later ventures had but little success. Yet Dr. Insh is able to show that had it not been for the political needs of Charles I., which led to his surrender of Scottish rights to the French, the possibilities of the situation were vast. The Scots had established a hold upon the St. Lawrence which might have been used for unlimited expansion, and at home the surplus population was seeking an outlet. The story of the Darien venture, in which this later movement took form, is to be the subject of another volume.

We venture to query the statement that the creation of Nova Scotia Baronets followed the precedent of the Ulster Baronets. The conditions of the two grants in regard to settlement of the grantees on the land, employment of natives, etc., were widely different. Possibly Dr. Insh does not intend us to press the analogy. He has brought together in his book a quantity of curious information, as for example the English ordinance enjoining fasts which frankly states that its object is the encouragement of sea fisheries; and that one mansion, still surviving, the House of Menstrie, was the birthplace of both Sir William Alexander and of General Sir Ralph Abercrombie. At the same time he keeps distinct the current of his narrative. The book deserves to be read.

Studies in Empire and Trade. By J. W. Jeudwine. With Four Maps and Geographical Index London: Longmans, Green and Co., 1923. *Price* 21*s. net.*

"This book," says the author, "is the final result of some ten years of study, research, and collection of materials in a very wide field." A glance or two at the twenty-four appendices and at the voluminous notes and references to authorities is sufficiently convincing; while a careful reading of the text provides ample confirmation. The general index has been most carefully compiled, and we add a note of high praise for the maps, which, so far as we have tested them, show the name of every place mentioned in the book.

The subject is divided into five parts:—1. Mediaeval Adventure, Seamanship, and Trade: the Vikings, the Crusades, Hanseatic League, Land Routes to the East. 2. The Discovery of the East to Europeans: the Voyages inspired by Prince Henry the Navigator, Columbus, the Dissolution of European Unity, the Closing of the Ports by Philip II. 3. The Attack on the Iberian Monopolies: North-East and North-West Passages, the Panama Route, Europeans in South America, the

Invasion and Permanent Occupation of Tropical Regions. 4. The Direct Attack on the Monopoly of the Indies: English and Dutch Voyages, the Trading Companies, the English East India Company. 5. The European Viking in the Indies: Territorial Conquest, British and French in North America, the Seven Years' War, India and the East India Company. The thirtieth and last chapter gives concluding observations.

With the author's general conclusions as regards the permanence of the British Empire there will be general agreement. No empire can continue to exist if based upon physical force. A free community of nations, united by loyalty to a common hereditary ruler, is a definition for the most important part of our empire which is almost a truism. It is when Mr. Jeudwine comes to the tropical dependencies that difficulties arise. When he argues that little or no attempt is being made to understand the mentality or the social system of the subject peoples, we are inclined to think that he is overstating his case. When he points out the uselessness of forcing our system of government upon peoples to whom, by age-long traditions, it is quite unsuited, we heartily agree with him. But we have not been able to discover exactly what he means us to do. Are we to retire altogether from our tropical possessions, and confine our dealings with them to trade? Is Kenya colony, for example, to be left as a battle-ground for the European and Indian settlers, the natives, and any invaders who like to come from outside?

We should like to add a word or two about the author's views on Ireland, which, we think, are rather unnecessarily dragged in, but merely refer to one point. Surely it is not true that any British Government in recent times has administered Ireland in the interests of an "alien minority." This is a minor point, but there is throughout evidence of a distinct fondness for generalisations which do not seem to have a strong foundation. For example (p. 60), "Our present wealth of Unions and Leagues, and the Fascisti and Sinn Fein and the League of Nations are streams from the same source of political anarchy." And again (p. 112), ". . . A republic is always the most short-sighted and selfish of social systems, looking only to immediate profits, and expecting of its rulers quick material returns for the powers given to them. No republic, and no political system which takes republican form, is in the least likely to risk any adventure which does not offer results measurable in ready money." And again (p. 362), "I have never heard or read of any government, especially one that is republican, that had any moral sense." These statements seem, to say the least of them, rather sweeping for such a serious and otherwise trustworthy work as this.

The Life of Sir Ernest Shackleton. By H. R. Mill. Pp. 312. Illustrations and Text-Maps. London: W. Heinemann, Ltd., 1923. *Price* 21*s. net.*

Sir Ernest Shackleton has been fortunate in his biographer. Dr. Mill is not only thoroughly conversant with every aspect of Antarctic exploration, but also was a friend of Shackleton for many years. Those who knew Shackleton little either loved or disliked him; those who knew him better were fascinated by his personality, and a character so engaging and yet so contradictory. He was a ceaseless enigma to his friends, but to know Shackleton was in itself an experience worth having. It is rare that a man who loves publicity and is not averse to limelight is also a great man of action, but Shackleton combined both qualities. As a leader in the field, as an organiser, and above all as an inspirer of a forlorn hope, Shackleton was at his best. He loved physical difficulties because he knew he could master them. The history of polar exploration contains no more heroic adventure than Shackleton's boat journey of 800 miles from Elephant Island to South Georgia across the tempestuous seas of the Southern Ocean. At home in

civilisation Shackleton was less successful, indeed often as not a failure, in the many schemes that his fertile imagination seemed to suggest as ways to an easy fortune. On this side of his activities Dr. Mill has relatively little to say, and he is wise to be reticent.

The book is divided into three sections, the titles of which epitomise "the impetuous torrent of his life." "Equipment"—from childhood to the *Discovery*, and his office as secretary to this Society; "Achievement"—the *Nimrod* expedition, the Southern record, and the days of great popularity; "Battlement"—from the *Endurance* to his untimely end in South Georgia. Shackleton passed away as he would have wished—long before his time, it is true, and yet we cannot imagine a Shackleton too old for high adventure on the seas. He fitted so ill into twentieth-century civilisation that Fate was kind in saving him from having to settle into some humdrum "shore job."

The Epilogue, which summarises the character of Shackleton, is perhaps the best chapter in the book, and recalls vividly the man we knew, admired, and often criticised. It is a true picture, with the strong lights most in evidence, but the shadows not omitted.

There is a slight inaccuracy on p. 88 in reference to the *Scotia* expedition. It was in his second, not first, season in the Weddell Sea that Bruce reached Ross's sounding and proved it to be 2660 fathoms. R. N. R. B.

L'Empire Britannique: Étude de Géographie Coloniale. Par Albert Demangeon. Professeur de Géographie à la Sorbonne. Paris: Armand Colin, 1923. *Prix 7 fr.*

Written with all the careful analysis in which the French excel, this little volume is a valuable contribution to a great subject. It is divided into three parts, first the formation, then the colonisation and civilisation, and lastly the problems, of the British Empire. The author points out that "among all the countries of that Europe which has done so much to explore, people, and exploit the world, Great Britain is the one which has been most moulded and stirred by the spirit of colonisation. No family there exists without a son overseas, no journal without giving its readers an account of the distant corners of the Empire. There is no family which does not consume some products of the Empire, no career which has not an opening to the Colonies, no industry which does not work for a colonial market, no great port which does not trade with a possession of His Majesty, no well-to-do man nor capitalist who does not own colonial stock, there is no safety for the country if the route of the Colonies is not open and the fleet is not free, and there has been no war which has not either increased or defended the Empire. Without its possessions abroad, the United Kingdom is nothing but a little archipelago on the coasts of Europe; with them, however, it becomes a centre of humanity. The Briton owns property everywhere, and everywhere English is spoken. The Briton never finds himself alone abroad, for no voyage deprives him long of his flag. Great commercial houses, factories, merchant fleets, banks, book-stores,—what would become of Great Britain without her Empire?"

After a most painstaking, elaborate, and well-documented survey of the British Empire, M. Demangeon arrives at certain conclusions which he has formed with regard to its continuance. He finds the Empire subject to three factors which are inevitable owing to its geographical dispersion and its human composition. These are distance, heterogeneity, and ubiquity. Owing to distance, the populations forming the Empire are so separated from each other as to be deprived of territorial continuity. Owing to heterogeneity, the Empire rules peoples so different in regard to civilisation as to make fusion apparently impossible. Owing to ubiquity,

it finds itself in contact with all other countries and all the religions and races of the world. However, the Empire has two protections against distance and geographical isolation, namely, the freedom of the seas, which maintains its material connection, and the liberty of the peoples, which maintains its moral union. Will this form of union suffice to uphold the edifice? Or will there be federation among all the members of the Empire—that is to say, a union defined by treaty or contract and founded on the equality of all?

Against the heterogeneity of the Empire, there is no remedy to hope for in a fusion of races or even in assimilation. Of all colonial Powers, Great Britain governs the greatest number of dwellers in the tropics, India alone forming a colossal mass of 300 million natives. Certainly in future something else is wanted, in order to govern India, than clever diplomacy and a strong army. A policy of equality and liberty gradually bestowed is the only one which can prolong the paradoxical association of Great Britain and India,—of a little island and a vast continent. Will this always continue?

Against ubiquity, Great Britain cannot contend except by keeping herself strong. In conquering her Empire she scarcely thought of anything but the development of her commerce. But to protect that commerce she had to extend her conquests. She is found actively engaged wherever she can trade, whether among Mussulmans, yellow or black men. On every side she has to provide for conflicts of frontiers or business troubles, which are a heavy burden on the Empire. To solve this Imperial problem will be a strenuous task, but it will be solved if the Empire remains strong on the sea. That is the doctrine which has always inspired the policy of Britain even in the midst of her projects of general disarmament.

In a most useful appendix we find a detailed account of the British Empire, with the area, population, and principal exports of each of its possessions. There is also an excellent bibliography of seventy leading books on the Empire, with the authors' and publishers' names, the date of publication, and other details.

The Business Man's Geography. By E. G. R. Taylor, B.Sc. London: George Philip and Son, Ltd., 1923. *Price* 25*s. net.*

This book is what it professes to be—a business man's geography, that is, a convenient work of reference. The geographical or political areas described are arranged in alphabetical order, and an account is given of each under the heads of area and population, position, climate and general physical conditions, human and economic conditions, trade relations, and general information. Thus, although the book is not written to *teach* geography, it contains a great amount of material of much value alike to the teacher and to the student of the subject; and it has the further merit that it does indicate to those for whom it is primarily intended the nature of the influence which geographical conditions may exercise upon economic development. Miss Taylor not only writes accurately and concisely, but she shows considerable knowledge of commercial matters, and there is much in her book which should prove of practical service to those engaged in business. The chief problems of a geographical nature which confront the commercial world of to-day are, as a rule, carefully explained, though in some cases the treatment is not so full as it might be. For example, the reader is left under the impression that the ravages of the pink boll-worm account for the decreased yield per acre of cotton in Egypt, whereas the truth appears to be that defects in irrigation and drainage are responsible for the greater part of that decrease. Again, while it is true that the pink boll-worm has reappeared in Texas, the destruction of recent years, amounting in 1920 and 1921 to over 20 per cent. of the total crop, has been mainly the work of

the boll-weevil. The scarcity of labour has also contributed to the decreased output of cotton in the United States. We also doubt whether Miss Taylor was well advised in giving, as she frequently does, statistics for production and trade in 1920. The economic conditions for that year were so abnormal in almost every respect that figures relating to production are necessarily out of date before they are printed, and possess at best merely a historical interest, while those which refer to the value of exports and imports may be positively misleading.

Throughout the book there are numerous sketch-maps; many of these should prove useful, though a few, unfortunately, are so overcrowded with material as to be almost unreadable. The "business man" will probably prefer a good atlas to the coloured maps at the beginning of the volume.

The Climate of the Continents. By W. G. Kendrew, M.A. Oxford: Clarendon Press, 1922. *Price* 21*s. net.*

We have nothing but praise to offer the author of the *Climates of the Continents* for his very handy and useful volume—almost, we believe, the first English work on climate treated from a geographical point of view.

Mr. Kendrew is ambitious, and his book covers an enormous field, and yet is not overburdened. The subject matter is divided into seven parts. The first part is introductory and contains information on that part of statistics which relates to climate. The remaining six parts deal with the climates of the several continents, each part being devoted to a continent. The following order is adopted: Africa, Asia, Europe, North America, South America, and Australia. In order not to interrupt the continuity of the text, Mr. Kendrew has wisely deferred the necessary tables of statistics relating to temperature and rainfall dealing with each particular continent to the end of each part. This is also useful for purposes of reference, and the plan adopted of printing extreme values in special type is an excellent one.

Generally the source of information is the latest available, and Mr. Kendrew has tendered his fullest acknowledgment to the authors of the works from which he has derived his information. Special reference has been made to the late Dr. J. von Hann for his classic, *Handbuch der Klimatologie*, which for many years to come will remain the standard book on Climatology. A list of the more important books and atlases referred to is given, which will also act as a guide to those desirous of going farther afield.

The book is supplied with nearly 150 clear and well-drawn maps and diagrams. The maps contain no unnecessary detail, and are easy to understand. Another method adopted of illustrating the text has been to give verbatim the experiences of various "eye-witnesses" of certain climatic conditions under which they have lived. Some of these experiences are very vividly described.

When we consider that the information upon which this book is based is largely statistical, Mr. Kendrew is to be congratulated upon the very lucid and pleasant manner he has treated a subject which in other hands might have resulted in a work which we should have read only for examination purposes or because we ought to be familiar with its contents. As it is, the *Climate of the Continents* is readable, and thoroughly to be recommended for study and reference.

J. E. Belasco.

BOOKS RECEIVED.

EUROPE.

The Highlands with Rope and Rücksack. By Ernest A. Baker, D.Litt., M.A. Illustrated from Photographs. Crown 8vo. Pp. 253. London: H. F. and G. Witherby, 1923. *Price* 12*s.* 6*d. net.*

Notes on the Names of the Closes and Wynds of Old Edinburgh. By Charles B. Boog Watson, F.S.A.Scot. Demy 4to. Pp. 156. Edinburgh: T. and A. Constable, Ltd., 1923. Reprinted from *The Book of the Old Edinburgh Club*, Vol. xii.

The Site of the Black Friars' Monastery from the Reformation to the Present Day. By William Cowan. Pp. 93.

The Maps of Edinburgh, 1544-1851. By William Cowan. Pp. 26.

The Buildings at the East End of Princes Street and Corner of the North Bridge: A Chapter in the Early History of the New Town of Edinburgh. By William Cowan. Pp. 18.

The Early Views and Plans of Edinburgh. By William Cowan. Pp. 13. Edinburgh, 1919.

The "Abers" and "Invers" of Scotland. By Erskine Beveridge, LL.D. Crown 8vo. Pp. xix + 128. Edinburgh: William Brown, 1923. *Price* 8*s.* 6*d. net.*

Holiday Rambles in the English Lake District. By Arthur L. Bagley. With 12 Illustrations. Crown 8vo. Pp. 210. London: Skeffington and Son, Ltd., 1923. *Price* 6*s. net.*

London and its Environs. By Karl Baedeker. 18th Revised Edition. Crown 8vo. Pp. xl + 574. Leipzig: Karl Baedeker, 1923.

The Tragedy of Central Europe. By Ellis Ashmead-Bartlett, C.B.E. Demy 8vo. Pp. 320. London: Thornton Butterworth, Ltd., 1923. Illustrated. *Price* 21*s. net.*

Encyclopédie Tchécoslovaque: Industrie et Commerce. Rédigé par Jaroslav Veselý. Demy 8vo. Pp. xxi + 594. Paris: Bossard, 1923.

Climbs on Alpine Peaks. By Abate Achille Ratti, Mountaineer (now Pope Pius xi.). Translated by J. E. C. Eaton. With a Foreword by Douglas Freshfield, and an Introduction by the Right Rev. L. C. Casartelli, Bishop of Salford. Crown 8vo. Pp. 136. London: T. Fisher Unwin, Ltd. *Price* 8*s.* 6*d.*

Swiss Travel Almanac. Edited by the Swiss Tourist Information Office. Summer Season, 1923. Otto Walter, Ltd., Olten.

Svenska Turistföreningens Årsskrift. Stockholm, 1923.

Footprints in Spain. By Lieut.-Col. H. A. Newell, F.R.G.S. Crown 8vo. Pp xii + 248. London: Methuen and Co., Ltd., 1923. *Price* 10*s.* 6*d.*

Griechisches Mittelmeergebiet. Von Otto Maull. Crown 8vo. Pp. 132. Breslau: Ferdinand Hirt, 1922.

ASIA.

Into the East: Notes on Burma and Malaya. By Richard Curle. With a Preface by Joseph Conrad. Crown 8vo. Pp. xxv + 224. London: Macmillan and Co., Ltd., 1923. *Price* 10*s.* 6*d. net.*

Angkor: Ruins in Cambodia. By Jeannerat de Beerski. With 65 Illustrations. Crown 8vo. Pp. 304. London: Grant Richards, Ltd., 1923. *Price* 18*s. net.*

The Sikhs of the Punjab. By R. E. Parry. Crown 8vo. Pp. 128. London: Drane's, 1923. *Price* 5*s.*

The Diary of Anada Ranga Pillai. Translated from the Tamil by order of the Government of Madras. Edited by H. Dodwell, M.A. Volume viii. Crown 8vo. Pp. xxv + 478. Madras, Government Press, 1922.

AFRICA.

Among Pygmies and Gorillas: With the Swedish Zoological Expedition to Central Africa, 1921. By Prince William of Sweden. Illustrated. Demy 8vo. Pp. xvi + 289. London: Gyldendal, 1923. *Price* 25*s. net.*

On the Edge of the Primeval Forest: Experiences and Observations of a Doctor in Equatorial Africa. By Professor Albert Schweitzer. Translated by Ch. Th. Campion, M.A. With 16 Illustrations. Crown 8vo. Pp. 180. London: A. and C. Black, 1923. *Price* 6*s.*

The Bakitara or Banyoro: The First Part of the Report of the Mackie Ethnological Expedition to Central Africa. By John Roscoe, M.A. Crown 8vo. Pp. xvi + 370. Cambridge: University Press, 1923. *Price* 25*s. net.*

Algeria To-day. By Lieut.-Col. Gordon Casserly, F.R.C.S. Illustrated from Photographs. Crown 8vo. Pp. xvi + 262. London: T. Werner Laurie, 1923. *Price* 16*s.*

Three Years in Tristan Da Cunha. By K. M. Barrow, wife of the Rev. J. G. Barrow, Missionary Clergyman in Tristan Da Cunha. With 37 Illustrations and a Map. New and Cheaper Edition. Crown 8vo. Pp. xii + 273. London: Skeffington and Son, Ltd., 1923. *Price* 7*s.* 6*d.*

AMERICA.

Canada To-day, 1923: Annual Reference Book on Canada. 7th Issue. Edited by Robert J. Arnott, M.A. London: The Canadian Newspaper Co., Ltd., 1923. *Price* 2*s.* 6*d. net.*

Geschichte der Vereinigten Staaten von Amerika. Von Ernst Daenell. Small Crown 8vo. Pp. 134. Berlin: B. G. Teubner, 1923.

Down the Yellowstone. By Lewis R. Freeman. With Illustrations. Crown 8vo. Pp. 282. London: William Heinemann, Ltd., 1923. *Price* 21*s.*

The Gods of Mexico. By Lewis Spence, F.R.A.I. Illustrated. Demy 8vo. Pp. xv + 388. London: T. Fisher Unwin, Ltd., 1923. *Price* 30*s.*

Histoire Générale de La Bolivie. Par Alcides Arguedas. Imperial 8vo. Pp. 156. Paris: Félix Alcan, 1923. *Prix* 12 *francs.*

Bermuda: Past and Present. A Descriptive and Historical Account of the Somers Islands. By Walter Brownell Hayward. Illustrated. Crown 8vo. Pp. xii + 237. London: Stanley Paul and Co., 1923. *Price* 8*s.* 6*d.*

AUSTRALASIA.

Australia, New Zealand, and Oceania in Pictures. By H. Clive Barnard, M.A., B.Litt. Royal 8vo. Pp. 64. London: A. and C. Black, Ltd., 1923. *Price* 3*s.* 6*d.*

Official Year-Book of the Commonwealth of Australia. No. 15, 1922. Prepared by C. H. Wickens, F.I.A., F.S.S. Editor: John Stonham, M.A. Pp. xxxviii + 1132. Melbourne, 1923.

Studies in Religion, Folk-Lore, and Custom in British North Borneo and the Malay Peninsula. By Ivor H. N. Evans, M.A. Demy 8vo. Pp. vii + 299. Cambridge: University Press, 1923. *Price* 20*s.*

Patrolling in Papua. By W. R. Humphries, A.R.M. With an Introduction by J. H. P. Murray, Lieut.-Governor and Chief Judicial Officer of Papua. Illustrated. Crown 8vo. Pp. 282. London : T. Fisher Unwin, Ltd., 1923. *Price* 21*s. net.*

Midst Volcanic Fires: An Account of Missionary Tours among the Volcanic Islands of the New Hebrides. By Maurice Frater. With 8 Illustrations. Crown 8vo. Pp. 288. London : James Clarke and Co., Ltd., 1923. *Price* 6*s.*

British (Terra Nova) Antarctic Expedition: Glaciology. By C. S. Wright, O.B.E., M.C., B.A., and R. E. Priestley, M.C., B.A. Royal 4to. Pp. xx + 581. London : Harrison and Sons, Ltd., 1922.

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The Life of Sir Ernest Shackleton, C.V.O., O.B.E. (Mil.), LL.D. By Hugh Robert Mill. Crown 8vo. Pp. xiv + 312. London : William Heinemann, Ltd., 1923. *Price* 21*s.*

Trifles and Travels. By Arthur Keyser. Royal 8vo. Pp. viii + 278. London : John Murray, 1923. *Price* 10*s.* 6*d.*

Ancient Man in Britain. By Donald A. Mackenzie. With Foreword by G. Elliot Smith, F.R.S. Crown 8vo. Pp. xii + 257. Glasgow : Blackie and Son, Ltd., 1922. *Price* 12*s.* 6*d. net.*

Towns and Town-Planning. Ancient and Modern. By T. Harold Hughes, F.S.I., and R. A. G. Lamborn, Hon. M.A. Oxon. Imperial 8vo. Pp. xii + 156. Oxford : Clarendon Press, 1923. *Price* 15*s.*

Kultur und Sprache. 2. Band. *Dänisches Heidentum.* Von Gudmund Schütte. Mit 26 Abbildungen. Crown 8vo. Pp. 154. Heidelberg : Carl Winter, 1923.

The World Story of 3000,000,000 (?) Years. By J. Reeves. With a Foreword by Prof. J. Arthur Thomson, M.A., LL.D. Demy 4to. Pp. 16. London : P. S. King and Son, Ltd., 1922. *Price* 2*s.* 6*d.*

Statistical Bibliography in Relation to the Growth of Modern Civilization : Two Lectures delivered in the University of Cambridge in May 1922. By E. W. Hulme, B.A. Imperial 8vo. Pp. 44. London : Grafton and Co., 1923. *Price* 6*s. net.*

The Statesman's Year-Book : Statistical and Historical Annual of the States of the World for the Year 1923. Edited by Sir John Scott Keltie, LL.D., and M. Epstein, M.A., Ph.D. 60th Annual Publication. Crown 8vo. Pp. xxxii + 1583. London : Macmillan and Co., Ltd., 1923. *Price* 20*s. net.*

Vocabolario Italiano-Swahili. By A. C. Cavicchioni. Crown 8vo. Pp. 216. Bologna : Nicola Zanichelli, 1923.

Board of Agriculture for Scotland. Agriculture Statistics, 1921. Edinburgh : H.M. Stationery Office, 1922.

Colonial Reports (Annual).—Seychelles (1146) ; Turks and Caicos Islands (1147) ; British Solomon Islands Protectorate (1148) ; Mauritius (1149) ; Sierra Leone (1150) ; Uganda (1151) ; Colony and Protectorate of Kenya (1153) ; Gold Coast (1154). Edinburgh : H.M. Stationery Office, 1923.

EDUCATIONAL.

The Progress to Geography. By Richard Wilson, B.A., D.Litt. Stage v. *Britain and Europe.* Crown 8vo. Pp. 303. Stage vi. *Britain and the Modern World.* Crown 8vo. Pp. 313. London : Macmillan and Co., Ltd., 1923. *Price* 4*s.* 6*d.*

The Principles of Geography: Physical and Human. By E. G. Skeat, Sc.D., F.G.S. (Mrs. Woods). Crown 8vo. Pp. 432. Oxford : Clarendon Press, 1923. *Price* 6*s.* 6*d.*

The Home of Man. Part II. *Europe.* By W. Campbell Brown, M.A., F.C.P., and P. H. Johnson, B.A., L.C.P. Crown 8vo. Pp. 265. London: George G. Harrap and Co., Ltd., 1923. *Price* 2*s.* 6*d.*

An Exercise Book of the Geography of China. By F. W. Sawdon, B.Sc. Royal 8vo. Pp. 52. London: Macmillan and Co., Ltd., 1922.

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"SOUTH AFRICA" MAP OF CENTRAL AND SOUTH AFRICA, 1923.

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Scale 1 : 31,680.—California, 8.

United States Geological Survey, Washington.

SOUTH AMERICA, 1 : 1,000,000. La Paz, SE. 19. 1922. Provisional edition.

American Geographical Society, New York.

The best map of the area which has been published. It is to be hoped that, when the next edition is issued, there will be an improvement in the colour grading of altitude, which is not satisfactory.

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THE SCOTTISH GEOGRAPHICAL MAGAZINE.

THE GEOGRAPHICAL POSITION OF THE BRITISH EMPIRE.[1]

By VAUGHAN CORNISH, D.Sc.

Part I.—The Position which has been occupied.

THE British Empire, although situated in every continent, with shores on all the oceans, is seen to have a definite geographical position when we consider the ports of call which unite its lands and the naval stations which guard the communications. During the growth of the Empire eastward and westward from Great Britain numerous harbours were held at different times, those retained being a selection unrivalled by the ports of any other State in commercial and strategic position. Our many oceanic islands give us, moreover, an important advantage in the selection of maritime stations for aircraft.

The naval station of Bermuda, well withdrawn from aerial attack, has a central position in the great western embayment of North America intermediate between the ocean routes which connect Great Britain with Canada and the West Indies. No foreign ports flank the route between Canada and the west coast of Great Britain. At the western gateway of the South Atlantic we have excellent harbourage in the Falkland Isles. Malta, the capital of our Fleet in the Mediterranean, has a commanding position at the Straits which connect the eastern and western basins, and the naval station at Gibraltar helps to ensure the junction of the Home and Mediterranean Fleet and to protect the Cape route. Our status in the Sudan, the vulnerable frontier of Egypt, is still maintained, and the British army which is kept in Egypt as garrison of the Suez Canal ensures our use of this gateway

[1] Presidential Address to Section E. (Geography), at the Liverpool Meeting of the British Association, September 1923.

as long as we can navigate the Mediterranean. If that navigation be interrupted we can still oppose the seizure of the Isthmus, for we are able to send reinforcements by way of the Red Sea. East of Egypt the British island of Perim stands in the Straits of Bab-el-Mandeb, and the garrisoned fuelling station of Aden provides the necessary port of call on the routes to Bombay and Colombo. Colombo, in the Crown Colony of Ceylon, is at the parting of the ways for Australia and the farthest parts of our Asiatic possessions, and Singapore stands at the narrow gateway of the shortest route between India and the Far East.

The Cape route to India and Australasia is improved by British ports of call in Sierra Leone, St. Helena, and Mauritius, and is more effectively dominated from British South Africa than at first appears, for although there is open sea to the south there are no useful harbours in the Antarctic continent, and on the African coasts the harbours are under British control for a thousand miles from Cape Town.

Of the six great foreign Powers the French alone are posted on the flank of both routes between Great Britain and the Indian Ocean, and no Great Power has its home territory on that ocean, or railway connection thereto from its home territory.

Thus the principal lands of the British Empire—Canada, the British Isles, South Africa, India, and Australasia—have good communications with one another across the Atlantic and Indian Oceans both in peace and war.

The conditions of strategic communication across the North Pacific, on the contrary, are adverse to us, owing mainly to the circumstance that we opened up British Columbia across the prairies and by the coasting voyage. Had our colonising route been across the Pacific, the Hawaiian Islands, which were first brought into touch with the Western world by the ships of the Royal Navy, would have been a British settlement and one of our first-class naval stations. As things happened, however, these islands were first needed by the Americans, and now form the essential western outpost of the United States Navy. Between them and British Columbia the ocean is empty of islands, and Fanning Island, south-west of Hawaii, with the adjacent small coral islands in our possession, are no adequate substitute, even apart from overshadowing by a first-class naval station in the neighbourhood. Thus there is no good strategic communication between Australasia and Canada across the North Pacific. In this connection it must be remembered that cousinship does not relieve the American Government from the obligations which international law imposes upon neutrals. It was not until three years after the outbreak of the Great War that America could offer us any facilities in the harbour of Honolulu which were not equally open to Germans. It must also be noticed that we have no control of the Panama route between New Zealand and Great Britain.

Turning to the question of communication between British Columbia and India, it is important to realise that the Pacific coasts of North

America and Asia are in a direct line with one another, forming part of a great circle, so that there is no short cut across the ocean, as the map misleadingly suggests. Thus the course between Vancouver and Hong Kong is not only very long, but also closely flanked by the home ports of Japan and many outlying Japanese islands, so that its security in time of war depends upon the attitude of the Japanese.

When, therefore, we differentiate the routes on which we have well-placed naval stations and recruiting bases from those dominated by the ports of some other Great Power, we see that the lands of the Empire are united by the Atlantic and Indian Oceans and strategically separated by the North Pacific. Thus the form in which the Mercator map is usually drawn by the British cartographers with Canada in the upper left and Australasia in the lower right corner is a good representation of our maritime Empire. It shows the lands as connected by the Atlantic and the Indian but not by the Pacific Ocean ; Great Britain, the naval and military headquarters of the Empire, on the central meridian ; and Port Said and Cape Town as connecting positions between the western and eastern parts of the Empire.

Upon this map a symmetrical distribution of our lands is revealed when a great circle is drawn connecting Halifax in Nova Scotia, the eastern terminal port of the Canadian Pacific Railway, with Fremantle, the western terminal port of the Australian railway system. This truly direct line, twisted on Mercator's map into the form of the letter S, extends just half-way round the meridians but is somewhat shorter than the semi-circumference of the globe, the difference of latitude between Halifax, N.S., and Fremantle being less than ninety degrees. The line passes through Lower Egypt close to the Suez Canal following the general direction of the main track of the Empire, which is the steaming route from Canada to Great Britain, and thence by the Suez Canal to India and Australia. At one end of the line lies the Canadian Dominion, and at the other Australasia, to the north the British Isles, and to the south the Union of South Africa, the chief homes of the British nation. Our coloured peoples are also distributed symmetrically about the line, India being on the east, the Crown Colonies and the Protectorates of Africa on the west, so that it is the axis of symmetry of the Empire. Not far from its middle point is the Isthmus of Suez, where our direct line of sea communication is crossed by the only continuous route for the international railways which will connect our Indian and African possessions, and adjacent to the Isthmus is the central station of our airways.

Such is the form and position of the British Empire, regarded as a maritime organisation, which in fact it is.

The Empire thus mapped has an Intermediate Position among the commercial, national, religious, and racial communities of the world such as is occupied by no other State. The ocean routes must always be the Link between the two great land areas of the world, and in the present state of land communication provide the connection between

the numerous independent systems of continental railways. The chief of these systems is based on the ports of Continental Europe, of which the greatest communicate with the ocean, and therefore with other railway systems, by way of the English Channel. Thus the island of Great Britain is intermediate between the principal termini of the European railways and the other railway systems. Its harbourage is unequalled by that of any country of Continental Europe, and its supply of shipbuilding material and coal exceptionally good. Thus the physical characters of the island accord with its position on the commercial map, and the Metropolitan British in their Intermediate Position have become the chief common carriers of international commerce. Much of this profitable business used to be in the hands of smaller European States, whose commerce eventually suffered from their inability to defend themselves against more powerful neighbours. Our merchant shipping is protected by the Royal Navy, but owing to the recent development of fighting aircraft ships of war can no longer protect the island itself, and since the close of the recent War this citadel of the Empire, the home of two-thirds of the white population, has been more exposed to attack from the Continent than at any previous time during the last eight hundred years.

The Suez Canal, where we have the principal control, is the gateway between the railway termini of Europe, the greatest manufacturing centre of the world, and those of the monsoon region of Asia, the greatest centre of population. It is also on the shortest route between the railways of North America and India.

The commercial and strategic importance of Singapore as an Intermediate Position between India and the Far East is enhanced by the circumstance that railway communication between them is debarred by the greatest mountain system in the world.

Hong Kong, at the chief gateway of southern China, is typical of British maritime stations both in its Intermediate Position and in the facilities provided for the ships of other nations, which swell the vast tonnage entered and cleared at the port.

How far-reaching is the effect of our Intermediate Position is revealed by the important but little-recognised fact that it is the British naval stations which would, if available, provide America with the best line for reinforcement of the Philippines, the Achilles' heel of the Republic. The distance of Manila from the naval shipbuilding yards of the United States is almost exactly the same by Suez and Panama, but the Pacific connection has never been good owing to the great distance between stations, and is now worse than before the Great War on account of the island mandates acquired by the Japanese. The relation of Port Said and Singapore to America and the Philippines is only one of many cases in which our position is intermediate between the home and colonial possessions of a white nation. Thus the important French possession of Indo-China has to be reached from France either by way of the Suez Canal, where we maintain a garrison, or by rounding the Cape, where

we have a national recruiting base, as well as a station of the Royal Navy. The true significance of our Intermediate Position has, however, been generally missed owing to a one-sided interpretation of strategical geography. An intermediate station, particularly a naval station, has commonly been regarded as a blocking position, a Barrier where freedom of movement can be interfered with. The historical fact is, however, that the harbours of the British Empire have also been a Link between nations. In the Great War the British Empire was the Link of the Allied and Associated Powers, and its geographical position is unequalled for making a benevolent alliance effective or checkmating the action of an alliance formed with a sinister purpose.

The British Empire provides in Canada the one Link between the European and American divisions of the white race, for public opinion in the United States adheres to the view that the New World, in the sense of North and South America, should be shut off and sheltered from the evils of a bad Old Europe.

In Tropical Australia the British, in the exercise of their discretion, have set up a Barrier between the white and coloured races. Australia is a land almost empty of aboriginals, which has for the most part a climate in which British children thrive and develop true to type. In the great basin of the Murray River and its confluents, not far from the huge superficial deposit of brown coal in South Victoria, is a combination of fertile soil, forcing sun, water for irrigation, and cheap electric power transmitted from the coal-field. This favoured region, the "Heart of Australia," as it has been called, with a population of only three million, is equal in size to France, Italy, and Germany combined, which have a population of more than one hundred and thirty million. The problem of Australian settlement is, however, complicated by the circumstance that the northern coast-lands lie in the Tropics, and have a climate which makes field work very arduous to white men. It is, moreover, uncertain if British families would continue true to ancestral type in this climate. If, however, settlers from the neighbouring monsoon lands of Asia be admitted, whose descendants would rapidly increase, it would be impossible to maintain a colour line between Tropical and Temperate Australia, and the rough labour of the Commonwealth would in time be done by coloured people. The fact that this labour is cheap would result in the employment of a great number of coolies instead of the use of machinery, and Australia might become a land of coloured workmen and white overseers. Circumstances, therefore, forced the Australians to decide whether their tropical belt should be a Link or a Barrier between white and coloured labour. The decision to erect a Barrier was taken early, and has been consistently maintained. The strategic responsibility of the decision is seen to be very great when we look into the future and reflect on the facts of population.

Of the 1650 million people in the world, the whites number about 500 and the coloured 1150. The former are mainly grouped on the

two sides of the North Atlantic Ocean; of the latter, the greater part, about 800 million, are in the monsoon region of Asia, which includes India, Indo-China, China proper, and Japan. The Australian British are far from the main body of the white race and from Great Britain, the chief recruiting base of their own nation. On the other hand, the distance by sea between Townsville, Queensland, and the Japanese coast is no longer than the course of the coasting steamers from Fremantle to Townsville; and the other lands of monsoon Asia are even nearer than Japan.

Enough is known of the relation between geographical environment and national well-being to declare with confidence that the decision to erect a Barrier against coloured labour in tropical Australia is best both for the white race in Australia and for the coloured people of the monsoon region of Asia. Not only is government much more difficult with a two-colour population, but the admission of coolie labour would deteriorate the national character of the Australians, for history shows that the greatest nations are those which provide their own working class. Turning from the Occidental to the broader humanitarian view, it is only necessary to look ahead in order to see that the admission of Asiatic coolies to a British homeland is unkind to their descendants. Those that remain unmixed in race will have a stunted existence as a community cut off from full national life, whilst the case of mulatto descendants is almost worse, for the children are not brought up in the family of the British parent, and yet are cut off from the full tradition of Asiatic civilisation. Far better, then, that the Asiatic coolie should remain where the family life of his descendants will be part and parcel of national life.

Neither should it be assumed that there is not room in Asia for a large additional population. The pressure of population in China is largely due to the undeveloped condition of mining, factories, and communications. The coalfields are unsurpassed in the world, and iron ore is abundant; if they were worked, and factories were based upon them, the new occupations and improved market for agricultural produce would provide at home for many of those who now migrate oversea. The rise in standard of living which may be expected to follow industrial development would also reduce coolie competition in the white borderlands of the Pacific. The further development of manufacture in India would operate in the same direction. The growth of a manufacturing population in China and India would stimulate cultivation and stock-rearing in the sparsely inhabited region under Asiatic rule which runs diagonally across the meridians from the Persian Gulf to the Amur, and includes the eastern provinces of Persia at the one end and Mongolia and Manchuria at the other. This has for the most part a light rainfall, but comprises much fine prairie country and some good agricultural land, whilst in the more arid tracts there are many great rivers fed from snowfields and glaciers which could be made to irrigate large areas where the sun is as strong as in Australia. Adjacent to the Indo-Chinese

peninsula are the East Indies, whose climate is suited both to Indians and Chinese, with great tracts of undeveloped land whose productivity is attested by luxuriant forest. The sparsely peopled regions of Asia near to India, China, and Japan by land and sea, and for the most part connected with them by ties of civilisation, provide an area for the overflow from these countries which is more than twice as large as tropical Australia and British Columbia, together with California, Washington, and Oregon, the American frontier provinces of English-speaking labour.

India includes one of the most important borderlands within the Orient, that of the Mohammedan and Hindu worlds. The Punjab, with its great rivers and plain, is in such striking contrast to the mountains and plateau of Iran that we are apt to lose sight of the fact that, climatically, it more resembles the highland on the west than the rainy valley of the Ganges on the east. It is an eastern borderland of Islam, a religious world which is mainly comprised in the belt of dry country which stretches diagonally from the Atlantic shore of Morocco to the Altai Mountains. Delhi, under the Great Moghul, was an advanced capital of the Mohammedan world just within the Ganges valley, which is the headquarters of Hinduism. In this sub-imperial capital the two antagonistic civilisations are now linked to the government of the United Kingdom, and the age-long wars between them have ceased.

Up to the time of British predominance India was the terminal position of continental conquerors unused to the sea, who did not develop the advantages of a salient maritime position. The ports of India lie conveniently for a long stretch of coast-land on the great gulf which forms the Indian Ocean, and now, owing to the facilities provided by British shipping, much of this coast-land has easier communication with India than with its own continental interior. Several British possessions in the parts of Africa adjacent to the Indian Ocean are in the Intermediate Position between the principal homelands of the black peoples and the overflowing population of India, and nowhere has the responsibility of our Intermediate Position called for more careful examination of the rights and interests of competing coloured races. The decision with reference to Kenya which has just been given by the home Government recognises the main physical regions in the coloured world as political divisions of the Empire within which the established races have special rights.

The Union of South Africa is the racial home of white men and of the more numerous coloured people who are indigenous to the country. It is, therefore, largely a land of white overseers and coloured labour, but here, as in the other Britains beyond the seas, there is an opposition to the introduction of coloured blood into white families which is not met with where Latin races are similarly situated. The Dutch families are at one with those of British stock in the maintenance of this racial Barrier.

From the foregoing facts it is clear that the British people, Metro-

politan and Colonial,[1] are in a greater degree than any other nation the doorkeepers of the world in respect of economic, strategic, and racial communications.

Part II.—The Consolidation of the Position.

The consolidation of the position which the British nation has won turns upon the future of colonisation within the Empire. We must therefore compare the number of the Metropolitan and Colonial British with that of other peoples within and without the Empire, and take account of the relation between the present population of the world and the area of its empty lands. The British Empire comprises the fourth part of mankind, but the ratio of white to coloured people in the Empire is only about one to six. The former are mostly of British stock, and belong to the Christian world. The latter are of many stocks, differing physically from each other as much as from the white people, and belonging to diverse religions. Their population is steadily increasing under British rule, and some of them have recently made advances in political organisation and industrial efficiency. Consequently, if the Empire is to be guided by the British, the numbers of our race must also increase. There is, however, a school of thought which considers that if our ideals of ethics and efficiency are once accepted by the coloured peoples, the racial complexion of the Empire will be unimportant, as public affairs will be regulated by our principles. This point of view, which may be termed in a general sense the missionary standpoint, does not take account of the contingency that British ideals implanted in coloured stock may receive alien development in future generations owing to biological causes. Our confidence in Western culture in general, and the British version of that culture in particular, is based more upon the power of adaptation which it has shown in our hands since the Renaissance and the era of oceanic discovery than upon any system of which we can hand over a written prescription. It is only in our own national communities, mainly composed of British stock, with minorities nearly akin, that we can be confident that British ideals will develop typically in the way of natural evolution. Therefore in our own interests and in that of the coloured races (who conflict among themselves) it is desirable to maintain the present proportion of the British stock, to whom the Empire owes the just administration of law and a progressive physical science.

The co-operation of the Union of South Africa in the Great War only became possible after the failure of an insurrection by part of the Boers. Since the number of persons of Dutch and British stock is about equal, an influx of British colonists is required in order to ensure unanimity between South Africa and the rest of the Empire.

[1] The introduction of the term "Dominion" served to suggest emancipation from the Colonial Office, but the word Colonial as descriptive of a people has permanent historical value and therefore should not be allowed to lapse.

Passing to the ratios between British population and foreign nations, we have to note that the population of Australia stands to that of Japan as about one to ten. The Japanese are a patriotic as well as an advanced nation, and claim equality with the white nations from patriotic motives. It is evident, therefore, that a strong reinforcement of British population is needed to maintain the doctrine of a white Australia. For the same reason New Zealand also needs reinforcement, since Australasia is strategically one.

The number and density of the population of Canada is exceeded in the proportion of about ten to one by the white population of the United States, hence it is inevitable that there should be a large flow of people from the latter country to the Dominion. As it is essential to unanimity in the Empire that the Canadians should continue to be British in sentiment and not become pan-American, a large immigration from Great Britain is required in Canada. Moreover, the population of Continental Europe outnumbers that of Great Britain [1] in the proportion of something like ten to one, and as emigrants go to Canada from many European countries there is a further call for British immigrants to maintain the British character of the Dominion.

We have next to note that the population of Great Britain, which is now forty-three million, outnumbers the combined population of Canada, Newfoundland, South Africa, Australia, and New Zealand in the proportion of two and a half to one, and increases more rapidly than that of all these Dominions, more than three and a half million being added in the decade 1901-11, in spite of an emigration which much exceeded the immigration. Thus the chief source available for the British peopling of the Dominions is the Metropolitan, not the Colonial, population.

In 1891 the late Mr. G. Ravenstein calculated from the rate of increase of population the time which remained before the unoccupied lands of the world would be settled and developed in accordance with their agricultural capabilities. This period he reckoned at about two centuries, by which time the population was calculated at 6,000,000,000 instead of the 1,600,000,000 which it had reached in 1891. The figure must not be taken to indicate the final population of the world, about which we know nothing, but the epoch marks finality of a certain kind—namely, the end of the colonising period of history as colonising has hitherto been conducted. The world will then be completely parcelled out among the nations, and since it is very difficult to displace a nation, it is probable that those which occupy the world at the end of the colonising period will remain in possession for a long time, even as time is reckoned in the pages of history. If we allow a generation for the set-back of the War we may roughly reckon our zero-time as 1923 instead of 1891, which, on the basis of Mr. Ravenstein's figures, would

[1] In the present condition of home affairs in Ireland it seems best to leave its population out of the numerical reckoning for Imperial purposes.

still give about two centuries, or six generations, in which to provide the temperate climates of the British Empire with a sufficiency of British stock to ensure the continuance of their British character.

There is, however, a school of thought which sees the salvation of the home country in a reduction of its population. I take their strategic argument first. It is contended that Great Britain would be safer in time of war if it had no more people than its farms can feed. Judging by France and the former Austro Hungarian Monarchy, this would be about one half of our present population, for our country is small though fertile. The conditions of our strategic security have, however, undergone a great change since 1914. The best plan of campaign for a combination of European Powers bent on overthrowing the citadel of the Empire would be an attack by combined air-fleets, which could be concentrated on London, the great manufacturing towns, and the shipbuilding yards, wholly destroying them one by one by intensive bombardment. This plan would be more effective than naval blockade, which it is very difficult to make complete, and is liable to bring in new belligerents owing to interference with neutral shipping. In order to have strategic security in this island we must therefore be able to meet the air-force of a European combination as well as carry out our traditional plan of despatching a powerful expeditionary force for the support of a friendly Power. This active defence requires large population and high development of technical industries, and therefore could not be sustained by a rural Britain.

The economic argument for reduced population has received ready but uncritical assent owing to the great want of employment since the War. It is stated that this island will never be able to support in proper comfort a population of forty-three million, the present figure. But the population which can be sustained in a country depends jointly upon internal resources and geographical position. The commercial position of Great Britain is more favourable than that of any other island of equal size, and the large amount of good coal, besides iron ore and beds of salt, enable full advantage to be taken of the geographical position in manufacturing for export. According to the estimate made in 1905 the stock of accessible coal in the United Kingdom is sufficient to last more than four hundred years at the present rate of output, and an estimate made in 1915 gives a yet larger stock. Moreover, no change in the distribution of available minerals can ever do away with the commercial advantage conferred by our central and focal position on the natural maritime routes. Hence the population which can be supported in Great Britain depends upon services to outside nations to a much greater extent than in most countries.

The population which can be maintained in our home country depends, therefore, to an exceptional degree upon the population and prosperity of the rest of the world, so that when the world again gets into its stride there should be improved conditions here, and as the population of the world grows so should the number of jobs in the

country increase. There is, therefore, no sufficient ground for stating that we have passed or reached the limit of population which the island can ever support.

The teaching of those who advocate reduction of population as the salvation of Great Britain includes eugenic and ethical arguments. Thus it is said that very small families conduce to a high standard of civilisation, since more care can be devoted to the child. This, however, leaves out of account the educative influence of the children of a family upon one another. Every one knows that an only child is at a disadvantage in life. The world being of both sexes, and the society in which we move mainly of our own generation, the full home training for life is only obtained if each child have a brother and sister, which implies a family of at least four.

The desirability of birth-restriction among the poorer classes is strongly pressed on the plea that we are breeding to an increasing extent from inferior stock, and thereby lowering the national type. As far as the allegation relates to defectives, it is indisputable that most of them are among the poorest of the poor, and that their breeding is an injury to the community, as is also the admission of defective or criminal aliens, but these are categories quite apart from our great working-class community.

The professional families are far too few to maintain the supply of original genius needed for this country's advance, for genius is largely in the nature of a sport, and has to be replenished from a very large reservoir of population. To recruit the professions entirely from the present professional families would, therefore, in the long run be fatal to originality. On the other side of the picture, a working-class home is the best preparatory school for the colonial frontier, where to have few wants is better than the possession of many attainments.

We are told that an increase of population in Great Britain will pack the slums and thereby reduce us to the "C 3" category of physique, but this argument takes too little account of the redistribution of urban population which has been going on for the last forty years. The density of population in Central London has diminished, and factories have sprung up along the railways which radiate from the town. In 1911 the five counties surrounding London, with their two included county boroughs, contained no less than one million residents born in London who had migrated into these more rural districts. Migration, it should be observed, whether to or from the town, prevents the close breeding which used to be a serious disgenic factor in villages.

In 1911 the birth-rate in the towns of England and Wales was higher than in the rural areas, and the Registrar-General's Report states that even when these figures are corrected for the movement of the people the rural districts would only have increased at the same rate as the country at large, adding that "these facts are worth noting in view of the assumption, sometimes loosely made, that the population of the towns would cease to increase if it were not recruited from the country."

In this connection it should also be noted that the proportion of London residents who are London-born has steadily increased from 1881 onwards.

The growth of our towns is no longer haphazard, but has entered on the stage of planning.

A great abatement of the contamination of town air by smoke has been shown to be practicable, and it is largely in the matter of smoke and crowding that towns have been hygienically inferior to the country, for country cottages are often as bad in themselves as slum houses, and their water supply much inferior. Moreover, the hygiene of towns has always been dependent on the circumstance that here the health of many people is affected by the carelessness of a few, and it follows that the hygienic conditions of urban life are capable of immense improvement when scientific knowledge becomes general. The experience of the War has shown that the popular notion of the inferior moral of townsmen was unduly pessimistic, for our urban regiments not only showed intelligence, but exhibited a sustained valour which has seldom been surpassed in the long annals of military history.

That emigration to the Dominions brings some economic benefit to the home country cannot be gainsaid, for trade returns show that an emigrant to the Dominions buys as much here as eleven emigrants to the United States, and therefore as much as many foreigners; but those who fear additions to our people also fear the moral effects of emigration. They say that emigration will take the best and leave the worst, and so produce a disgenic effect in the home country. But the individual emigration of to-day differs in this respect from the group migrations under political compulsion, or for conscience sake, which inflicted eugenic loss upon Spain, France, and England in bygone days. The best lad for the Dominions is not necessarily the best for the home country, and an Empire which comprises urban as well as rural States requires young men whose business tenacity is sufficient to resist the restlessness of youth not less than those who are instinct with the spirit of the frontiersman.

That a relative increase of female migration would benefit national character cannot be gainsaid, for at present the Dominion frontiers lack the due weight of feminine influence, whilst in Great Britain many women are denied the full development of their character which some natures only attain by wedlock and motherhood. The census of 1911, unaffected by war losses, shows an excess of about 1,300,000 females in Great Britain and a deficiency of about 750,000 in the Dominions. The inequality of distribution as between Great Britain and the Dominions limits the possible marriage-rate, and therefore the total births, in a way to which no other nation is equally subject. If the numbers in the Dominions be equalised as the result of special encouragement of female emigration, there will still remain a large excess of women in Great Britain who cannot be paired in the Empire unless the stream of emigrants who now leave the Empire can be for the most

part deflected to the Dominions. In Great Britain the total number of families is limited by the number of males. In dealing with the size of family needed to maintain or increase population I do not reckon the present surplus of nearly two million women resulting from the joint effect of migration and war. At present our community appears to be in a transitional stage between the limitation of the family by chance and by choice, but the census shows, from the present age of marriage in Great Britain and the number of deaths before this age, that a general preference for the family of three children would not quite maintain the population, apart from migration. If, therefore, the size of family be universally decided by choice the number of the race cannot even be maintained, far less increased, under present conditions unless those who enter into matrimony cherish the ideal of a family of four children.

Unless the British race increase we cannot ensure the internal peace and external security of the Empire, or the continuance of its beneficent work of enlarging commerce and restricting the range of war. Therefore the birth-rate in Great Britain should be maintained above the death-rate at least until the British population in the Dominions exceeds that in the Mother Country. The maintenance of the race will then rest chiefly with our people oversea, and, with their great resources, it should be possible for them to keep pace with the other growing nations.

THE EVOLUTION OF THE HIGH PLATEAU OF BRAZIL.[1]

By Robert R. Walls, M.A., B.Sc.

(With Sketch-Map and Illustrations.)

The High Plateau of Brazil presents a very steep escarpment slope to the south-east Atlantic coast and a long and very gentle slope to the north and west. From the sea off the south-east coast, therefore, the plateau appears as a long precipitous ridge, to which the name Serra do Mar or Coast Range has been given. The average height of this coast range is nearly four thousand feet, and compared with its southern aspect all other mountain ranges of Brazil are insignificant. Yet on the high plateau itself there are outstanding ridges which make important water partings, and scored out of the plateau are great river valleys which, owing to their depth, appear to have minor mountain ranges on their banks. Thus we have a great many serras or ridges, the name Serra being now often very loosely used to denote ridges of no tectonic importance, owing their origin to erosion.

Geologically, the highest part of the plateau is composed of the very oldest Archaean rocks, while rocks of more recent date only appear on the flanks to the north and west. The rocks are chiefly granite and

[1] A lecture delivered before the Society.

gneiss, but these are occasionally overlaid by beds of hard sandstone and quartzite, often very similar in general appearance to the Torridon sandstone of north-west Scotland. The quartzites are much harder and more resistant to the action of weathering than the granites and gneisses, and where they occur generally appear as ridges rising above the average level of the plateau. Particular instances of such ridges are the Serra do Espinhaco in the State of Minas Geraes, and the Serra des Cristaes in the State of Goyaz. Unless subsequent agents such as river action or marine denudation have served to throw them into greater relief, however, these are not conspicuous ridges or serras proper but gently rising uplands.

While the highest part of the plateau is composed of very ancient

Fig. 1.—Serras formed by river erosion—Rio das Velhas.

granites, gneisses, and quartzites, rocks of much more recent date appear on the flanks far to the north and west. The whole geological structure seems to indicate that the plateau is a very ancient land surface, and has in fact been a land surface from the very earliest times. Incursions of the sea in subsequent geological times have never submerged the high plateau itself, though they made deep indentations into it. The history of these invasions of the sea is of supreme importance in tracing the evolution of the plateau. In Permian times a long arm of the sea invaded it from the north, extending down roughly as far as 20° S. The shores of this sea on the south, east, and west were naturally the older Archaean rocks. The eastern and western shores were capped with hard quartzites which resisted the denuding action of the sea. In Triassic times the sea appears to have largely receded from this area, although it still occupied a large part of what is now the State of São

Paulo, having invaded this area from the north-west. By the end of Mesozoic times, however, the sea had retreated entirely from the high plateau region, and it would appear that this part of the South American continent has been slowly but steadily rising ever since.

The physical features of the plateau are the direct result of its geological structure. The land which rose above the seas of Permian and Triassic times still persists as uplands on the plateau. They are consequently tectonic features of some importance and deserve special denomination. That part of the plateau to the south which is of prime

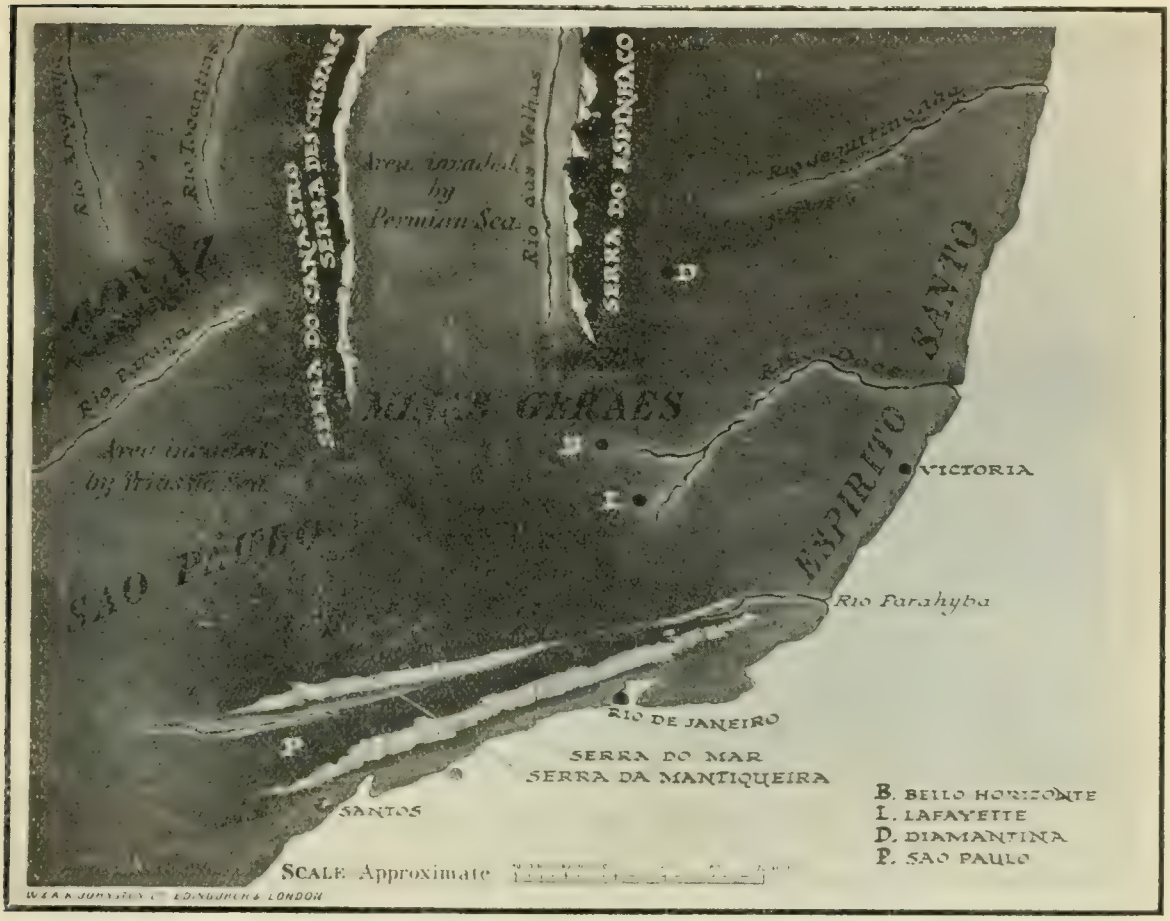

FIG. 2.—Physical features of High Plateau of Brazil.

importance is the Serra do Mar. The long ridge, chiefly composed of hard quartzites, which formed the eastern shore of the Permian sea is the Serra do Espinhaco or Backbone Ridge, while that which formed the western shore of the Permian sea and also the eastern shore of the Triassic sea may be termed the Serra do Canastro. These two latter names seem to have disappeared very largely from modern Brazilian geography, yet from the point of view of evolution and of their real tectonic importance it seems quite necessary to retain them. The Serra do Canastro is not very well marked; in many places there is no visible serra at all, and at other places outstanding uplands receive names of local importance only. The Serra des Cristaes, for instance, is only a

local name for what is in reality a part of the Serra do Canastro, but nowhere so far as the writer knows is there any well-defined ridge worthy of the name Serra. The Serra do Espinhaco, however, is different. It forms a well-marked escarpment on its western side. It would appear that the Permian seas beat against a cliff of Archæan rocks protected by a hard cap of sandstone. We have here, therefore, a serra produced by marine erosion of the plateau. When seen from the west the Serra do Espinhaco does present a well-defined ridge worthy of the name Serra, though on its eastern side it rolls down gently and almost imperceptibly to the Atlantic Ocean.

The high plateau is a rising area, but the rise is not due to folding

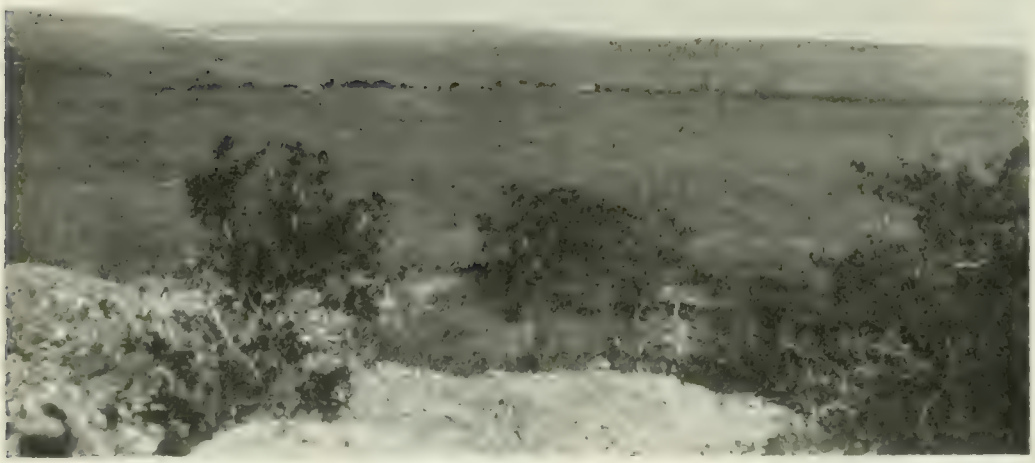

Fig. 3.—View along ridge of the Serra des Cristaes.

and buckling of the earth's crust. It is rising as a whole. The chief line of uplift is the Serra do Mar, close to the south-east coast, and the uplift gradually decreases from this line northwards. The rise may be compared to that of a hinged trap-door with the opening along the south-east Atlantic coast and the hinge-line many hundreds of miles to the north. This slow and gradual rise from Mesozoic times has had the effect of gradually driving off the invading sea from the high plateau northwards to its present position. As the sea withdrew, however, the reclaimed areas were occupied by great drainage systems with their outlets receding farther and farther north. These reclaimed areas are now the basins of magnificent rivers.

With regard to the height of the various parts of the plateau above sea-level only very general statements can be made, as no extensive map contouring has yet been done. The Serra do Mar and the Serra do

Canastro perhaps average four thousand feet along their highest ridges, and the Serra do Espinhaco perhaps five thousand feet along its highest ridge. This seems anomalous after our statement that the Serra do Mar was the line of highest uplift. But the Serra do Mar is composed chiefly of granite and gneiss, which are subject to the action of weathering and decay, whereas the Serra do Espinhaco is capped by more resistant quartzites. The area between the Serra do Espinhaco and the Serra do Canastro is a rolling plain about two thousand feet above sea-level. The descent of the high plateau to the north and west is always a gradual and almost imperceptible slope, and the limits of the plateau in these directions cannot be fixed by any natural boundary line.

When the geological structure and history of the plateau are understood, the problem of the evolution of the river system is simple. The majority of those rivers which rise on the Serra do Espinhaco flow down the gentle eastward slope to the Atlantic Ocean. Amongst these may be mentioned the Rio Doce or Sweet River and the Rio Jequitinonha. The area between the Serra do Espinhaco and the Serra do Canastro is drained by the Rio das Velhas or Old Women's River, which is a feeder of the Rio São Francisco. West of the Serra do Canastro we have the Parana and its tributaries flowing west and then south to the Rio de la Plata, and to the north the Tocantins and the Araguaya, which follow the course of the recession of the sea after Triassic times.

One curious river still requires explanation, the Rio Parahyba. It flows almost due east, cutting a huge trench right across the highest part of the plateau. The valley is many miles across, and its sides rise in places over three thousand feet above the present river level. This huge trench in the oldest Archaean rocks appears to be a very ancient feature of the landscape, since only in long geological epochs could such a gigantic valley have been excavated by a river. As the high plateau appears to be a very ancient land surface, so the Rio Parahyba appears to be one of the original rivers which has persisted to the present day. The valley contains within its vast area many lake and river deposits of recent geological date. The cutting out of this gigantic valley has broken up the continuity of the plateau into two parallel ridges. Thus we have the Serra do Mar left to the south as a real ridge or serra and we have the edge of the plateau to the north again. This edge has received the title Serra da Mantiqueira. Here is another case in which the term Serra has been applied to a slope which is not a mountain ridge but is due to river erosion in the plateau.

The high plateau lies within the Tropics, but the heat is modified by the altitude. The winter temperature on the plateau is therefore about equivalent to the summer temperature of Great Britain. The rains fall chiefly in the hot season. The rainfall is considerable and, in spite of the large land mass, comparatively well distributed. The climate and abundant water supply ensure luxuriant vegetation. The type of vegetation varies somewhat with the geological formation of the country. The quartzites of the uplands on the plateau, being hard and non-porous,

drain off the water too quickly, and the vegetation on them, generally speaking, is of a drier and more xerophytic variety. The grass is of a coarser type and becomes hard and brittle in the dry season and of very little value for stock feeding. It is burned off by the natives each dry season to ensure a richer crop of young fresh grass for their cattle and horses when the rains begin. In many areas the quartzites are not conspicuous rock features, yet the great level stretches of dry and somewhat xerophytic vegetation are sufficient indication that the rocks beneath the soil are the horizontally bedded and non-porous quartzites.

The granites and gneisses give very rich soil when they weather, and as this soil retains water more efficiently it is more productive. The area between the Serra do Canastro and the Serra do Espinhaco,

FIG. 4.—Exposed quartzite on the Serra do Espinhaco.

invaded by the Permian sea, is now occupied by limestones and shales and gives rich grass and orchard lands. In the State of São Paulo, which lies on the western flanks of the plateau, the surface rocks are very largely reddish sandstones deposited during the invasion of the Triassic sea, and the state is well watered and has a rich soil. It is pre-eminently an agricultural state, coffee, sugar-cane, tropical fruits, and tobacco growing abundantly. Practically all the wide river valleys of the plateau contain fine soils for cultivation, and from its agricultural resources alone the high plateau may be reckoned to be very richly endowed.

But it is from its mineral and not from its agricultural resources that the high plateau has drawn its wealth. The number and variety of its mines have given the name Minas Geraes to the central and most important State. This means simply General Mines, and by far the greatest number of mines in Brazil are found in this State. Iron is very

abundant, but naturally in these very ancient rocks there is no coal to work it. Manganese is often associated with the iron ores and is worked to a large extent in the neighbourhood of Lafayette, about a hundred and fifty miles north of Rio de Janeiro. This manganese was in great demand for the manufacture of steel for war purposes, and the supplies appear almost inexhaustible. Copper, zinc, tin, and lead have also been found, but are not yet being worked to any great extent. Bauxite also seems to occur in considerable quantities but has not yet been mined on any scale. Good deposits of clay are found in practically all the river valleys and the manufacture of coarse pottery tiles, pipes, etc., is widespread.

Gold, silver, and precious stones are the chief minerals obtained from the high plateau so far. These have been worked almost entirely in placer mines in the river beds, but gold has also been extracted to a smaller extent from quartz veins and occasionally from lodes. The large lode of the St. John del Rey Company at Morro Velho near Bello Horizonte is perhaps the best known of the rock mines. Silver is also extracted at this mine. Diamonds are worked from sedimentary deposits, either recent or ancient, and little or no attempt has been made to discover the sites where the diamonds originated. The ease with which the precious ores and stones can be extracted from placer mines by cheap unskilled black labour has naturally been detrimental to rock mining in a wild upland country where transport is difficult. The extreme riches of the river deposits also made geological exploration for rock mines scarcely worth while, and in this connection it might be stated that the sands and gravels of these ancient rivers have been washed for gold and precious stones for the last four hundred years and are still being washed by numerous mining companies with profit. The question very naturally arises here, "Where is the birthplace of these precious minerals, and whence have the rivers extracted all this vast wealth?" Yet though the question is so obvious, comparatively little scientific investigation has been carried out to solve it. More detailed geological mapping of the high plateau is urgently necessary.

Since the discovery of Brazil in 1500 exploration and development have penetrated the country almost entirely by its great waterways. The reason is clear. In the far north the Amazon and its tributaries are by far the easiest means of transport for thousands of miles into the interior. In the plateau region of the south-east, although the rivers are not so useful for transport, yet their valleys are very fertile, and the great mineral wealth so easily procured from the sands and river deposits have attracted most attention. Cross-country transport in the plateau region is done chiefly by horses, pack mules, or the slow lumbering ox-waggon. Even sheep and goats are frequently harnessed in teams to draw waggons. It is only very recently that railways have been able to penetrate into the interior from the great ports of Rio de Janeiro and Santos on the south-east coast. The great difficulty which the railway engineers had to contend with is the abrupt ascent of the

high plateau from the coast. All sorts of devices have been adopted to overcome this steep incline. Rack railways, where the engine comes behind the carriage and is fitted with a centre cog-wheel, are used in some places. Endless cable railways are used at others, and on the great Central Railway running north from Rio de Janeiro a marvellous system of loops and tunnels has been constructed which adds very considerably to the time and length of the railway journey. The railway

FIG. 5.—Electric rack railway ascending the Corcovada.

between the port of Santos and the town of São Paulo mounts to the high plateau by means of a series of five cable railways, each having its own stationary winding engine. Trains are broken into small sections, and a special engine with a powerful gripper takes charge of each section on the incline. The ordinary locomotives do not as a rule pass up and down the incline. By means of this elaborate and difficult system much has been done to open up the western area of the high plateau, and three-quarters of the world's coffee supply, the product of the State of São Paulo, is thus brought down to the sea for shipment.

The last great step in the evolution of this area, therefore, was due

to the enterprise of the engineers in overcoming the natural obstacles to the initiation of a railway system. A new era in the process of evolution commences here—an era of undoubted industrial development. Owing to the absence of coal hydro-electric engineering must to a large extent solve the problem of power; for mechanical power is the next requirement in the process of evolution. There is much immediate work for the practical geographer in mapping the various catchment areas and estimating the water-power available. There is wonderful scope for manufacturers in the great new market which is opening up here. So far as the high plateau of Brazil is concerned the chronicle of evolution up to the present has been written by the naturalist; the chronicle of the future will be written by the industrialist and economist.

FUTURE EXPLORATION OF THE AFRICAN QUADRANT OF ANTARCTICA.[1]

By Captain John King Davis, F.R.G.S.

(With Chart and Sketch-Map.)

A recent paper by Mr. F. Debenham[2] has strengthened a hope that, in the near future, an attempt will be made to continue the exploration of the Antarctic coast-line, commenced by the Australasian Expedition (1911–14) under Sir Douglas Mawson. The Western Base of that enterprise was on the Shackleton Ice Shelf—at a point 21 miles from its junction with Queen Mary Land; the terminal point, in a western direction, being Gaussberg in longitude 90° E. (approx.).

The coast-line between Gaussberg and the meridian of Greenwich remains uncharted, and is *practically* unknown. Various navigators (since Cook, 1773) have tried to penetrate the fringing ice. Of these, Biscoe was the only one who sighted *land* at Cape Ann, in 1831. Kemp reported an appearance of land some 10° E. of Cape Ann in 1833. The map (Fig. 1) shows the Enderby Quadrant with the "farthest south" attained by each navigator. The position of Cape Ann, as determined by Biscoe, is reliable, and the immediate locality would, in my opinion, be a suitable base for an expedition to establish a wintering station from which to examine the locality.

In this short paper I wish to direct the attention of members to the desirability of extending a charted coast-line east and west of Enderby Land, and to offer some suggestions for their consideration with reference to the execution of the work.

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[1] A paper read at the Wellington, New Zealand, meeting of the Australian Association for the Advancement of Science, January 1922.

[2] *The Geographical Journal*, March 1921.

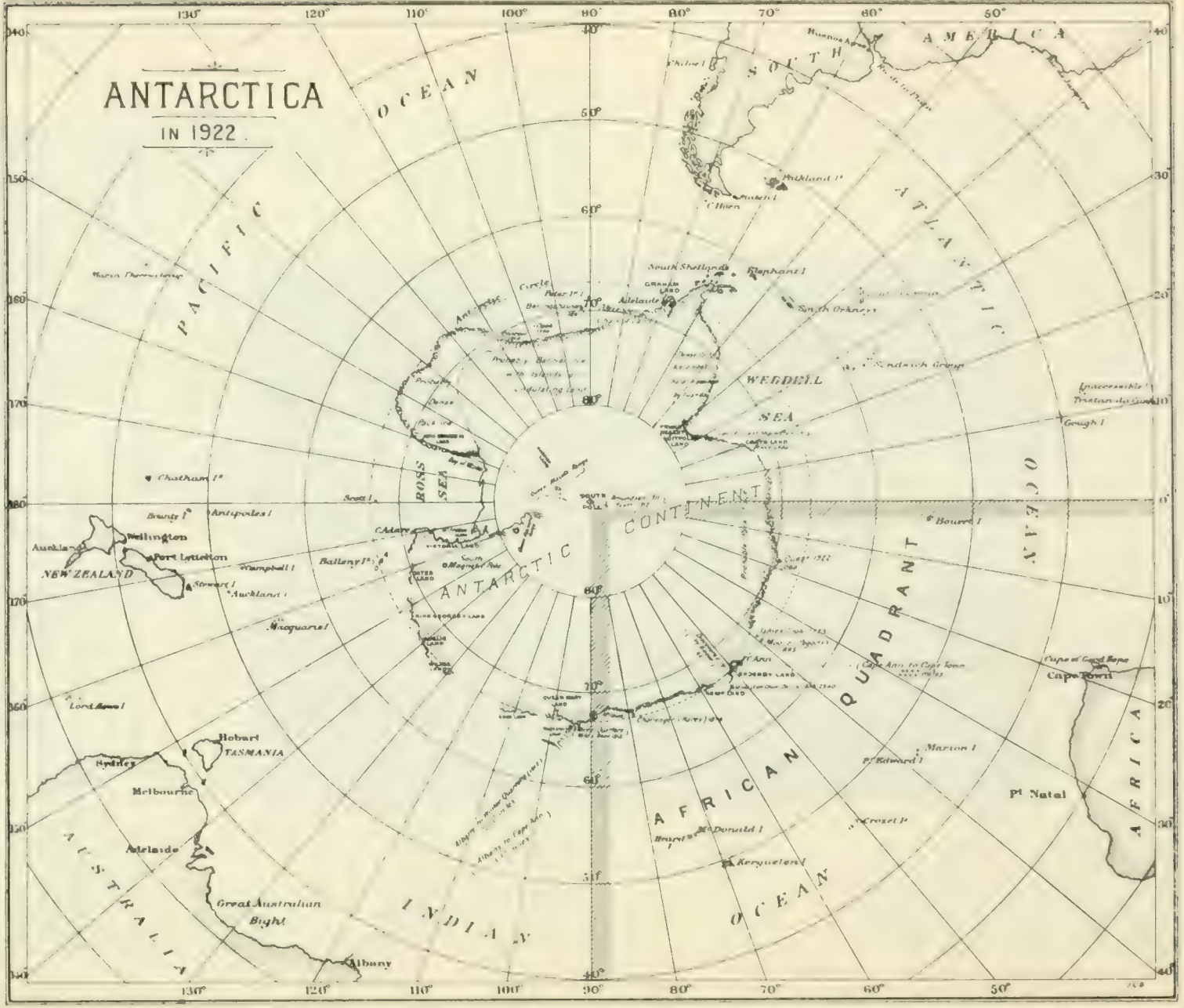

FIG. 1.—The known and unknown coasts of the Antarctic Continent.

It is needless to dwell on the importance of extending our knowledge in the direction indicated. Does the Antarctic Plateau extend to the meridian of Greenwich, or is it broken by a mountain range running southwards from the vicinity of Cape Ann? Many interesting problems require for their solution some reliable information concerning the nature of this hitherto unapproachable coast.

Enderby Land from its situation in the central portion of this unknown area is most favourably situated, and with a successful landing accomplished, all the work done would be of an entirely new character.

An aeroplane or seaplane should certainly form part of the equipment, and with a specially designed machine handled by an expert the nature of the coast-line east and west could be rapidly and easily determined before the sledge parties set out. A party of twelve men having been landed at winter quarters, the vessel could then be employed in outlining the coast-line in the direction which appeared most favourable during the remainder of that season, subsequently continuing oceanographical work until shortage of fuel made return necessary. With the advent of winter the vessel would return to port and early the following year would sail southward, embark the landing party, and fill in such blanks as remained.

In 1830 the firm of Enderby Brothers sent out John Biscoe on a sealing voyage in the Antarctic Ocean with the brig *Tula* and the cutter *Lively*. The following extracts from Biscoe's Journal[1] relate to the discovery of Enderby Land, February and March 1831 :—

"Feb. 6, 1831. During this day we steered an easterly course with little variation along the edge of the ice. The water was much discoloured and many other indications of land, but no soundings at 250 fathoms. . . . I now found the ice tending considerably to the northward. . . .

"Feb. 8. At noon lat. was 67° 12′ S. and long. 27° E. (approx.). The wind westerly, weather fine and clear. Ice generally from one to five miles to the southward.

"Feb. 24. At 8 P.M. saw an appearance of land to the southward, with many ice-islands, field-ice, and straggling pieces about us. . . . At 10.30 stood to the southward through much loose ice.

"Feb. 25. 66° 29′ S. 45° 17′ E. That which lately had the appearance of land now bore from ESE. to WSW. (true bearing), with a large range of field-ice stretching to the NE. Innumerable icebergs, and the vessel so encompassed with straggling pieces we could proceed no farther with safety owing to a strong NE. swell, which set towards the main body of the ice, which it now

[1] In possession of the Royal Geographical Society.

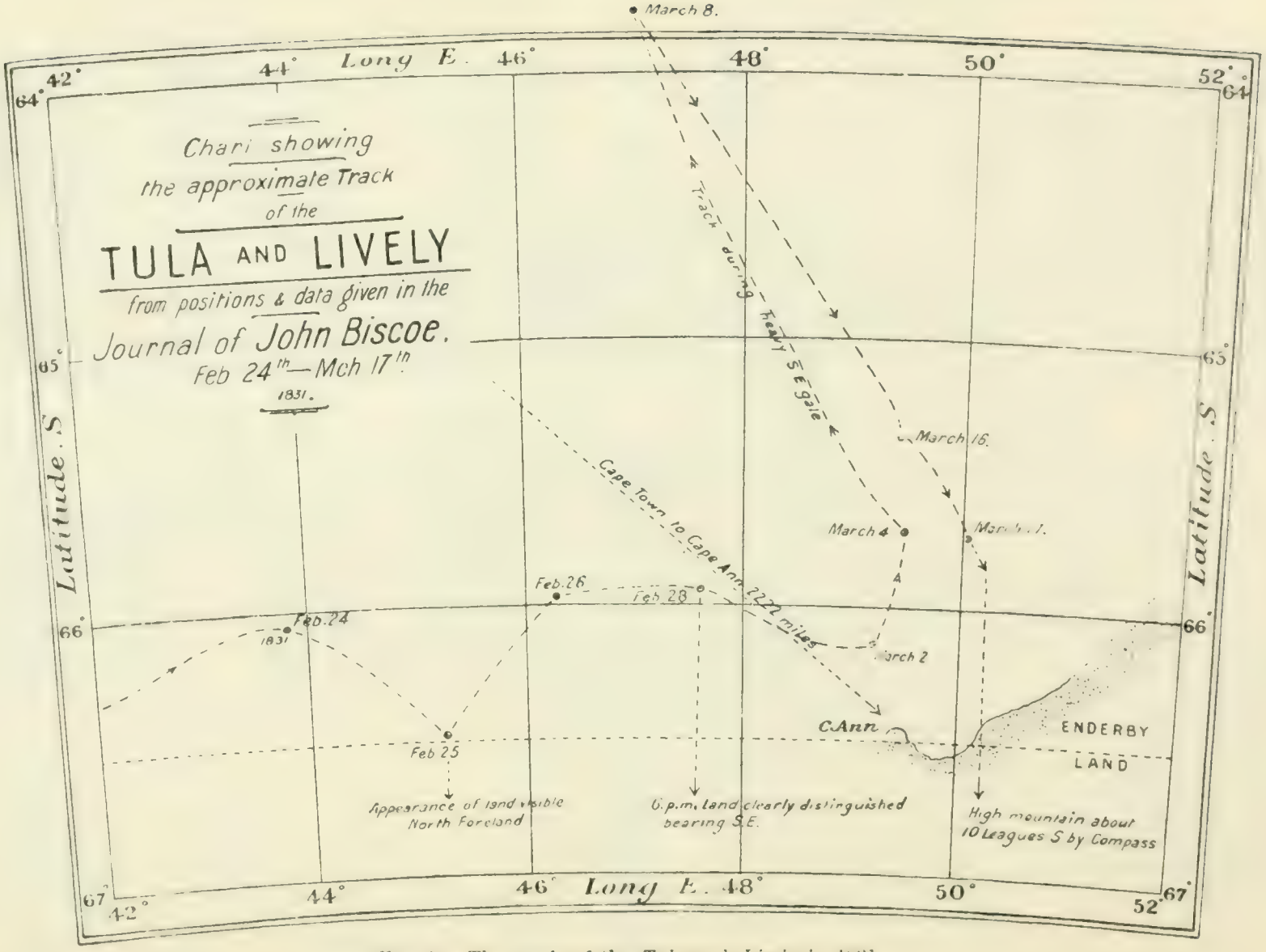

FIG. 2.—The track of the *Tula* and *Lively* in 1831.

proved to be; the appearance of it was, I think, similar to the North Foreland, and I should think the cliffs of it, which bore the marks of icebergs having been broken from off it, and which was exactly similar to their sides in every respect, was as high, or nearly so, as the North Foreland. It then ran away to the southward with a gradual ascent, with a perfectly smooth surface, and I could trace it in extent to at least from 30 to 40 miles from the foretop with a good telescope; it was then lost in the general glow of the atmosphere.

"Feb. 26.
65° 57′ S.
46° 17′ E.

Squally and thick weather.

"Feb. 28.
65° 57′ S.
47° 20′ 30″ E.

Passed southward through broken field-ice. At 4 P.M. saw several hummocks to the southward which much resembled tops of mountains, and at 6 P.M. clearly distinguished it to be *land* and to considerable extent; to my great satisfaction what we had first seen being the black tops of mountains showing themselves through the snow on the lower land, which however appeared to be a great distance off and completely beset with close field-ice and bergs. The body of the land bearing SE.

"March 1 & 2.
66° 7′ S.
49° 6′ 30″ E.

During the whole of these two days we were endeavouring to work a passage through the ice; but, after many fruitless attempts and some heavy blows, were always frustrated; as our attempts to near the land every hour opens some new object to us, and seeing a bluff point in SE. which has every appearance of a cape, I still have hopes of accomplishing my wish.

The main body from SW. to SE. about twelve leagues—nearly calm. Having stood far in among the ice, I found some difficulty in clearing again; and as the calm had lasted several hours, the sea froze to that excess that on the morning of March 3 we found the ice at least an inch thick over the whole surface of the water.

"March 3.

This morning, with the wind at SW., hauled round to approach . . . the most eastern part of the firm ice; and, after a run of about 15 miles due S., having entered a narrow channel of about 3 miles broad, formed on the west side by an immense chain of ice-islands and on the east by firm field-ice, and seeing an opening ahead from the masthead, was in great hopes

to find a passage direct to the land; but, at 6 P.M., we found it blocked up in every direction, so hauled out to the northward, and at 10 P.M. came into clear water. I have not been able in any one place to come within ten leagues of the land.

"March 4. 65° 42′ S. 49° 29′ E. We steered along the edge of the field-ice. At noon our position (by observation) was 65° 42′ S. and 49° 29′ E. By bearing at 4 P.M. the cape, which I have named Cape Ann, was in lat. 66° 25′ 00″ S., long. 49° 17′ 45″ E. At 6.30 P.M. a breeze sprung up from SE. with squalls—at midnight it freshened to a stiff breeze.

"March 5. Fresh gale—followed by thick weather. Gale increased, and at 12 blew a perfect hurricane, which

"March 8. 63° 49′ S. 47° 00′ E. lasted until the morning of March 8. Our head during the gale from ENE. to NE. When weather moderated this morning, the vessel was almost a wreck.

At 8 A.M. wore round to the southward. At noon our observations showed that a drift of 120 miles NNW. had been made during gale.

"March 8-14. Strong SE. gales—snow and sleet.

"March 15. Clear weather, at noon lat. 64° 43′ S.

"March 16. Stood to the southward Lat. 65° 16′ S.
D.R. long. 49° 27′ E.

"March 17. At 8 A.M., weather being moderate, saw land bearing south by compass, which was a very high mountain. Cape Ann was shortly after observed to bear SW. Our lat. at this time, 6 P.M., was 65° 44′ S., long. 50° 09′ E. Cape Ann W. by S. High land about south by compass, ten leagues.

From this time until March 22 we had SE. gales with little intermission, and made but little progress."

The *Tula* arrived at Hobart on May 10, 1831, with only Captain Biscoe, two mates, and a boy still able to work the vessel. Two of the crew had died and the remainder were down with scurvy.

The *Lively* was separated from the *Tula* in a storm and was unable to make Hobart, but reached Port Philip, where the crew landed and nearly died of starvation. The cutter drifted away and was found ashore a fortnight later, eventually rejoining the *Tula* at Hobart on September 3, 1831.

Biscoe's story brings vividly before us the heroism of these old-time pioneers who battled southward in small vessels, unveiling portions of

the "Unknown South Land" year after year. One feels glad that they were our kinsmen.

His message for us to-day is—"Complete the work begun and prove that the old sea spirit of our race has indeed survived all the changes of time and science."

THE REPUBLIC OF SAN MARINO.[1]

By the Rev. J. Arnott Hamilton, B.D.
Fellow of the Scottish Ecclesiological Society.

(With Sketch-Map and Illustration.)

Situated amid the foot-hills of the Apennines, bounded on the north by Emilia and on the south by the Marches, there exists the little Republic of San Marino, the only state in the Italian Peninsula which during the course of last century did not become part of the United Kingdom of Italy.

At its frontier it is some nine miles distant from the coast of the Adriatic, at Rimini, the nearest Italian town (Fig. 1).

San Marino is within sight of the main railway lines from Bologna to Rimini and Rimini to Brindisi. The capital of the state, the town of San Marino, is perched on the summit of a precipitous mountain called Monte Titano, which rises to a height of about 2500 feet above the level of the sea. As the train speeds on to Rimini, one can see from afar, set in a romantic distance and flanked by the grey-blue Apennines, the isolated mass of Monte Titano rearing its triple crest to the skies.

In spite of its proximity to the main lines, San Marino itself is quite off the main route. The tourist traffic passes by and no railway leads to it, though now that the all-conquering motor-bus runs to it from Rimini, the traveller can pay a visit with ease to the curious and interesting little state.

San Marino is one of the smallest countries in the world. It varies from about three to six miles long and is about five miles broad. Its population is about twelve thousand. Its area includes the whole of the rocky eminence of Monte Titano, and also a tract of undulating plain at the base of the mountain on all sides. While a considerable portion of the state is rocky and sparsely populated, the greater part of the tract on the plain is fertile and thickly inhabited.

The population of the capital amounts to about fifteen hundred. In addition to the capital, the Republic contains several villages—such as Borgo, nestling at the foot of the great cliff, and Serravalle, Fiorentino, Faetano, Domaghano, and Montegiardino, all on the plain.

The Republic of San Marino is thus a most diminutive state, but yet it can rightly claim an equal place among the nations of the world. For it owns allegiance to no one. It has its own government, its own

[1] A lecture delivered before the Society in Edinburgh on March 27, 1923.

Presidents or "Captain-Regents," its own Parliament, its own Diplomatic and Consular staff, its own flag of white and azure, its own coat-of-arms. It has its own postage-stamps, which are handsome labels showing a view of Monte Titano and are a considerable source of revenue to the state. It has its own standing army of sixty men, and its conscript militia, which can muster a strength of over a thousand. It concludes treaties with other lands—it made one with Great Britain in 1899. It declares war: it became one of our Allies in the Great War. In short, the Republic of San Marino, with its twenty-odd square

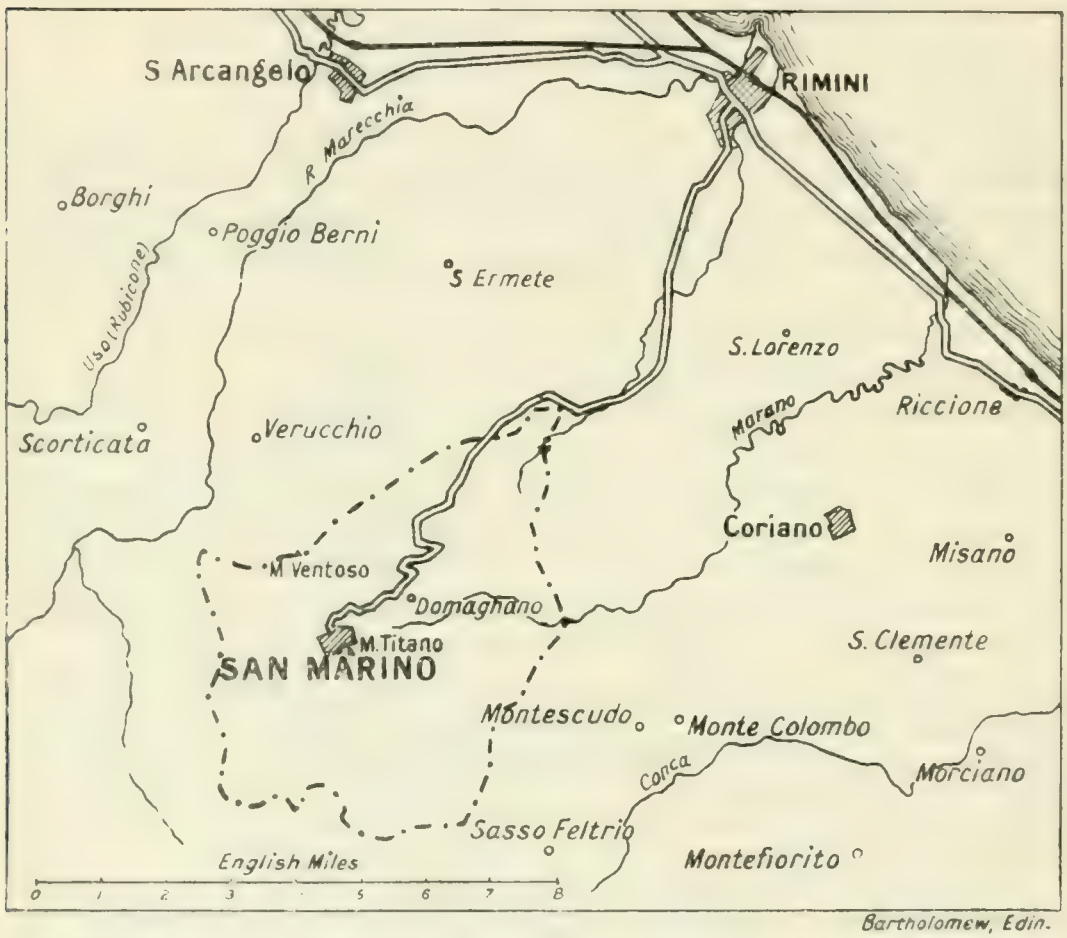

FIG. 1.—The republic of San Marino in its relation to the Adriatic coast at Rimini.

miles of area, is a sovereign independent European state, and is as much entitled to its position on the roll of nations as any of the great countries of the world.

The origins of San Marino date back to a very early period. Indeed, it claims to be the oldest state in Europe. The versions given about its beginnings vary in detail, but they all centre round the person of St. Marinus. It is said that in the fourth century of the Christian era two Christians, Leo and Marinus by name, fled from persecution in Arbe, in Dalmatia, to Rimini. They were stone-masons by trade, and they laboured at their occupation in their new home. Another version of the story makes them come over to preach to Christian slaves at Rimini.

After some time, however, Marinus, distracted by the evil of the world, and eager to lead a life of holy contemplation, betook himself to the lonely fastness of Monte Titano, where he lived the life of a hermit, remote from human strife. Leo, his friend, departed in the same way to the precipitous hill of San Leo, farther to the west. Marinus soon attained such a reputation for sanctity that others, desiring to embrace the hermit life, followed him to the mountain. Finally, the owner of Monte Titano, Donna Felicissima, a pious lady of Rimini, gifted it to him. The history of the place in these early days is wrapped in obscurity, but at some period a monastery was built and a population gathered on the slopes of the hill beneath its walls and under its suzerainty. Before the tenth century the population was granted a share in the government, the heads of families forming a Council, of which the President was presumably the head of the monastery. Civil government was completely substituted for ecclesiastical before 1253, for a document of that year makes mention of the General Council.

The history of San Marino has been uneventful. Sometimes small countries, owing to their geographical situation or for some other reason, have played an important part in history, but the isolation of San Marino has caused its history to be mainly of local interest. During the course of the centuries several attempts were made by filibusters and others to obtain possession of it: these invaders were mostly attracted by the strong position of Monte Titano, which commands the whole wide extent of plain down to the sea. Either such attempts—and they were few in number—failed, or freedom was regained after a brief interval. San Marino since its earliest days has never been subjected to a foreign yoke longer than for a period of a few months at a time.

In the thirteenth century the Bishops of Montefeltro vainly attempted to secure temporal dominion over it. At a later date the friendship of the Dukes of Urbino, whose territory lay to the south, safeguarded it from invasion by the Lords of Rimini. It is not necessary to recount the various attempts to capture the place. But mention may be made of one, which took place in 1543. In that year a certain Fabiano da Monte San Savino thought to settle himself on the rock. With a few hundred followers he marched in the darkness of the night to the foot of the mighty cliff. His forces separated into two, but in the darkness lost their way. The Sammarinesi got scent of the danger, and with the bell of the fortress clanging out in the stillness of the night they gathered at their posts and were ready to repulse the invader.

An event fraught with importance for the Republic took place in 1461. At the instigation of the Pope it united with the Duke of Urbino in attacking Sigismondo Malatesta, the tyrant of Rimini. As a reward for its services the Pope—Pius II.—granted it an accession of territory on the plain, which included the villages before mentioned. From that date the boundaries of the Republic have never altered. From the seventeenth century it was entirely surrounded by the Papal States.

The peaceful relations which subsisted between it and its neighbour were broken in 1739 by Cardinal Alberoni, Archbishop of Ravenna, who, aggrieved at the treatment of some malefactors, took possession of Monte Titano with an armed force. It was occupied for some time, but the dispute being referred to Clement XII., the aged Pontiff decided in favour of San Marino. The day of its deliverance is celebrated as a special holiday, and the memory of Clement XII. is held in high respect by Sammarinesi.

The year 1849 was marked by a visit from Garibaldi, who, retreating with his forces from Rome, took refuge for a short time in the independent state when pursued by the Austrian enemy. A statue of the Italian hero adorns the main street of the capital. Since the Union, the Republic has of course been entirely surrounded by the Kingdom of Italy.

To reach San Marino we board the motor in the open sunny square of Rimini near the massive arched gateway of the castle where the tyrant Malatesta once held sway. A conspicuous signboard painted with the words "Rimini—Repubblica di S. Marino" indicates our starting-place. In all notices San Marino is always prefixed by the words "Repubblica di." In fact, to the neighbourhood San Marino is usually known simply as "The Republic."

The level road runs southward through green fertile country dotted over with white farmhouses. To the left the land stretches flat: on the right it is undulating. Presently we turn west and begin to climb. About fourteen kilometres from Rimini we reach a little stone column, and at that point pass from the territory of Italy into that of San Marino. There are no harassing frontier regulations—it is delightful to find at least one frontier in Europe where it is not necessary to experience them!—so we speed on our way without stopping till we reach Serravalle, the first village of the Republic. Looking out we receive confirmation of the fact that we are no longer in Italy, for we observe on a wall an official notice headed with the words "Repubblica di S. Marino."

Presently we proceed. Now there rises up before us the gigantic precipices of Monte Titano. On either side of us the land undulates in waves and ridges, but it is well cultivated and farms and dwelling-houses are numerous. Fronting us in the distance stands out the dark range of the Apennines. Behind us, the ground falls to the plain, which sinks slowly into the Adriatic. The next halt is at Borgo Maggiore, a village nestling at the very base of the mountain-cliff. Borgo is a busy little place, and is noted in the neighbourhood for its cattle-market. After Borgo the road ascends higher and higher. On the left tower the scarped and jagged precipices of Monte Titano; on the right the hill slopes steeply down and the view extends over miles of ridge and hill and valley to the distant plain and sea. The road twists and curves, all the time ascending: it makes a semicircle round the mountain and finally reaches the Porta S. Francesco, a gate-

way dating from the fifteenth and sixteenth centuries which forms the entrance into the capital.

The cobbled streets are mostly narrow and are few in number. The houses are high, giving a sombre appearance to the narrower streets. The town is quite small, and in the daytime it is so quiet as to seem almost deserted. A few people at the doors, a few looking at the gorgeous panorama from the bastions of the old walls, a few waiting outside the Government Palace, are the sole signs of life.

There are few antiquities in San Marino, those extant consisting of some stone-carvings, old houses, arches, the town walls, the walls of much-restored churches, and the castle and towers on the triple summit.

A well-fitted-up and carefully arranged museum possesses objects from far and near, including some of local historical interest. It also contains an art gallery having an altar-piece attributed to Giulio Romano, and a library with all that pertains to the story of the Republic.

The main street climbs steeply up the hill. At a bend, opposite the before-mentioned statue of Garibaldi, is a handsome hospital. A few more steps lead past the one or two small shops to the Pianello, a broad terrace with the Government Palace, Law-Courts, Post-Office, etc., on three sides, and on the fourth a parapet, across which extends the open outlook to the Apennines.

The Government Palace (1884-1894) is a handsome erection in the style of the mediaeval communal palaces, with crenellated walls, pointed windows, and a spacious porch. At one end rises a bold clock-tower. Inside, a handsome staircase leads to Government offices and the hall where the Parliament of San Marino meets.

The Parliament—known as the "Consiglio Grande e Generale"[1]—consists of sixty members. At periods in the history of the Republic the number has been less or more. Formerly members were added by co-optation. As the original formation of the Council took place many hundreds of years ago, it may be said that the Governing Body lived without a break for centuries. It never died as ordinary parliaments do. In 1906 the constitution underwent a radical charge. A meeting of the Arringo—the heads of each family—was held, and it was decided and was afterwards passed by the Council that the method of appointment by co-optation be abolished. A new council of sixty was elected by popular vote. One-third retire every three years, and they or other candidates are elected to the Council directly by the Arringo Generale dei Capi-Famiglia.

A number of committees deal with finance, etc. The executive and presiding authority rests with two Presidents known as Capitani-Reggenti. They are elected by the Council from its members and hold office for six months. The elections take place on April 1 and

[1] Since 1906. From 1862 till 1906 it was called "Consiglio Principe e Sovrano."

October 1, and are the cause of much ceremony. In the Council-chamber there is to be seen the double throne of the Regents.

Among other objects of interest in the Government Palace is a full-length portrait of Queen Victoria and a tablet commemorating the Allied victory.

In front of the Palace, on the Pianello, there stands a statue of Liberty, who is represented as a full-length figure wearing a mural crown.

A word here may be said regarding the finances of the country. The revenue for 1922-1923 was 3,482,218 lire. The expenditure was 3,659,614 lire. Direct and indirect taxation is slight. Revenue is derived from the sale of the Government monopolies of salt and tobacco. There are no custom duties, but as goods which come from outside Italy to San Marino are taxed when entering Italy, an annual sum is paid over by the Italian to the Sammarinese Government as compensation.

It may be mentioned that in 1868 a gaming company craved permission from the state to open a Casino on its soil, making a handsome monetary offer and promising the construction of a railway and of institutions for the benefit of the population, but to its credit the Republic declined the offer.

A little higher than the Pianello stands what is often called the Cathedral. It is not actually a cathedral, San Marino not forming a separate diocese: its true designation is the Pieve or Parish Church. It was opened in 1838, its erection unfortunately involving the demolition of a very ancient church. It is built in the severe style of the classical revival, with a portico of Corinthian columns at the entrance, approached by a flight of steps. It has a spacious white interior, consisting of a nave and aisles terminated by a semicircular apse. The columns of the nave are carried round the altar, forming an ambulatory in the apse. At the end stands a statue of St. Marinus.

From the square in front of the church we go a few steps along a lane flanked by a high wall and pass out into the open. We are almost at the summit of the mountain. We have left the town: its houses cluster on the hill-slope below us. In front, at a level not much higher than that on which we stand, rise in a row the three crowning peaks of Monte Titano. The triple crest of the mountain is its most distinctive feature. The first peak is called Guaita and is crowned by the fortress, the Rocca. On the second peak, the Fratta, is a tower, and on the third, Montale, a still smaller tower. Each tower is surmounted by the carved emblem of a feather. The triple crest of Monte Titano with its towers has provided the coat-of-arms of the Republic. This consists of three green conventional hills on a blue background, each one crowned by a silver tower with a feather. A crown above and the word "Libertas" below complete the design.

To return from the heraldic hill to the actual hill itself. After quitting the town we gently ascend to the Rocca along a narrow grassy

ridge. The ground slopes to a hollow on one side: on the other the cliff falls sheer. The Rocca was erected in the fifteenth century, replacing a former fortress. Standing boldly on its lofty peak, it is a striking and impressive object. A great doorway leads to a desolate outer court, containing one or two old cannons and a small chapel in the wall to the right. An incline on the left leads up to another doorway which opens into the inner court. Here there is a little garden. This garden is bounded on three sides by the fortress and on the fourth by a wall, in the chinks of which the violet and the wild vine grow. You approach the wall and find yourself at the very edge of the cliff. At that point there suddenly bursts in upon your gaze the marvellous panorama which Monte Titano commands and which the

FIG. 2.—The Rocca, San Marino.

fortress walls and the undulations of the ground had hitherto hid from view. The rocky wall of the precipice drops down well on to a thousand feet. At its base lie the rolling fields of San Marino, bespeckled with villages and farms. Very diminutive villages and farms they appear to be when viewed from this eagle's nest. Across the country run the white roads, looking like shining white ribbons, stretched out and interlaced.

You amuse yourself by trying to trace the boundary of the little state. Its territory extends for about three miles in each direction—less on the west and south. Encircling the Republic are the long domains of Italy. As the vast extent of Italian territory unfolds itself to the gaze, and as mountain and plain and valley reveal themselves in

endless succession, our little Republic seems almost lost, like a tiny islet in a mighty expanse of ocean.

The country at the foot of the mountain is undulating; then it falls to a level plain which runs along the shore of the Adriatic. Rimini is a conspicuous object on the coast. Away to the north of it lies Ravenna. To the south-east is Ancona, and more to the south lies the mountainous district of Urbino.

From the top of the tower of the Rocca the view to the west, south-west, and nearer south is also visible. In the last-named direction extends the further expanse of Monte Titano with its two other tower-crowned crests of Fratta and Montale.

The path between the Rocca and the Fratta dips down into a deep hollow where no one could realise the height at which he was, the distant view is so obscured. At the foot of this hollow a number of workmen are usually engaged in quarrying and shaping stone. Monte Titano has been famous for its excellent stone from an early period. Indeed, one version of the story of St. Marinus makes the saint go to Monte Titano for the purpose of preaching Christianity to slaves who were engaged in stone-quarrying there.

The tower of the Fratta is a simple square structure standing on the edge of a perilous ridge. The third tower, that of Montale, is still smaller. It is octagonal and is away off the beaten track to the south.

To return to the view from the tower of the Rocca. On the west the slopes of Monte Titano sink down quietly to a broad valley through which runs the river San Marino. The western boundary of the Republic runs through this valley.

Beyond the river, at a distance of a few miles from the Rocca, the Apennines begin to rise, hill after hill, range after range, rearing themselves in multitudinous confusion to a remote horizon. Among them stands out conspicuously the singular and sinister-looking rock of San Leo, which is mentioned by Dante, and where over a hundred years ago the impostor Cagliostro was imprisoned and ended his life.

The day I was on the top of the Rocca there came on a heavy mist. It rose from the plain far below and swelled to the base of the fortress wall and twisted in little wreaths in and around its crannied stones. It recalled to mind the description which Robert Louis Stevenson gives of "The Sea-fogs" of California in "The Silverado Squatters," where he talks of sitting aloft in "the pure air and under the unclouded dome of heaven," and looking down "on the submergence of the valley. . . . Far away were hill-tops like little islands. Nearer a smoky surf beat about the foot of precipices and poured into all the coves of these rough mountains . . . that vast fog ocean lay in a trance of silence, nor did the sweet air of the morning tremble with a sound."

Even so was the mist which rolled from the Adriatic over the plain of Rimini to the cliffs of Monte Titano on that April day. It rose higher on the right and it drifted in clouds across the Fratta tower, which now was veiled in white and now stood out clear and well defined

upon its jagged rock. Then, as the day went on, the mist disappeared, and the sun pierced down to the plain, and the white roads and the villages and the fields of the vast expanse came open into view, until at last the evening shadows hid all the busy world from sight and the sun sank in glory behind the tangled chain of the Apennines.

With the great world far below it, with the famous movements of history passing by it, San Marino, perched on its lofty mountain-height, seems, geographically, politically, and historically, to be something curiously outside the ordinary world, something by itself, something distant, aloof, and separate. It has not desired to be otherwise. Napoleon, who admired it, offered to add to its territory and make it a much larger state. But it refused the offer, as it refused the offer of the gambling company for increased wealth. It remains to-day what it has always been—a little peasant state. Its inhabitants till the soil on the plain and hew the stone on Monte Titano as their ancesters did centuries ago. Its frontier has not been altered by an inch for almost five hundred years. Its history has been characterised by no turbulent and dramatic change.

The smallest Republic in the world, the oldest independent state in Europe, as it claims to be, it has lived out its long life quietly and unobtrusively.

Long may the inhabitants of the little Republic, with "Libertas" inscribed beneath the coat-of-arms of the triple tower-crowned peak, be able to make the boast which they make to-day that they live in the land of perpetual freedom.

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A NEW HISTORICAL GEOGRAPHY: A REVIEW.[1]

By Geo. G. Chisholm.

By geographers this work will be found a treasure; not the less a treasure because a good deal of delving will be required to get the full value out of it. The present reviewer is reminded by it of a remark

[1] *The Great Capitals: an Historical Geography.* By Vaughan Cornish, D.Sc. London: Methuen and Co., 1923. Price 12s. 6d.

made by Prof. Masson in his reply to John Stuart Mill's *Examination of Sir William Hamilton's Philosophy* that, whatever objections might be taken to that philosophy, it had at least the merit of greatly contributing to the worship of difficulty, an observation to which Mill gave his hearty assent. So also, if Dr. Cornish has in this volume done much to show the inherent difficulties in the subject of geography, we may congratulate him thereon. That is all to the good. Geographers will there find a bracing study in being forced to face difficulties that have to be faced in a thorough study of the subject. If it is the great concern of geography to deal with local influences of one kind or another, as is becoming more and more widely recognised in practice even when not avowedly so, geographers have constantly to reflect that those influences are multiform, rarely directly measurable, variable in their relative importance, and hence involving much thought to ascertain their full tale and estimate the weight to be given to each factor. Many illustrations of the fact are incidentally furnished in this volume, a study of which, made with the necessary care, including constant reference to adequate maps, will have at least this advantage, that the student will rise from the study with no doubt in his mind as to what geography is.

This may seem a large claim to make for a work dealing apparently with only a small portion of geography, only a few of the numberless towns with which the earth is crowded. But it must be remembered that the study of towns from a geographical point of view necessitates researches extending over larger or smaller areas, that of great capitals over very wide areas indeed. For all towns it involves considerations of two kinds, first those relating to the advantages or disadvantages of the precise site, and second, those as to the relation of the site to the surrounding country or even to remote regions ; and, while the first may have a good deal of significance, it is generally considerations of the latter kind that have to be kept in mind as explaining a town's growth and importance. It is obvious, however, that once towns begin to grow this very fact, when circumstances are otherwise favourable, becomes a cause of still further growth. As, therefore, the philologist in seeking to find out the explanation of a place-name goes back to the form of the name in the earliest accessible document, so Dr. Cornish, in seeking to explore the geographical value of a site, is often led to go back to the conditions of the time when the site first began to show its value. An excellent example of this is to be found in the exceedingly interesting treatment in this volume of the city of Moscow. Most geographers would probably be content to regard this city simply as a river confluence town situated about the middle of a productive and fairly uniform plain. But that is not enough for Dr. Cornish. He quotes a seventeenth-century Russian exclamation, "What man ever thought or divined that Moscow would become a kingdom!" (p. 187), and in setting forth the steps by which it did so he brings under the notice of the reader the important plain of the Mezhduriechie between the rivers Oka and Volga where they flow from west to east nearly parallel to one another, takes pains to

get him to understand the distinguishing features of this plain, and to indicate the manner in which far-reaching trade routes came to converge on the site where Moscow stands.

But this is merely a digressional illustration. It is time to indicate the structure of this highly original work, which brings out the relations between geography and history by a method entirely new. As might be expected from what has already been said, the author, in explaining the importance of capitals, generally lays more stress on the district than on the spot occupied by the capital. And in considering the different circumstances giving importance to a district he (as it seems to the present reviewer rightly) assigns the first place to the food supply. Without a surplus of food considerably in excess of the wants of the mere producers there can be no highly organised power, and the larger the supply the greater the population, the larger the surplus per head the greater the opportunity for organisation. Three circumstances are considered by Dr. Cornish as giving importance to a district—the fact of it being a storehouse, a crossways, or a stronghold (p. vii); and he finds that a great capital is usually either in a storehouse, that is, a region with great natural advantages for the production of food, or at a far-reaching crossways near a storehouse, is seldom in a stronghold. But the most novel and interesting idea in his thesis is that the capital of a great power is apt to be found in a forward position with reference to the principal enemy to be feared. The body of the book is taken up with the demonstration or attempts to furnish demonstrations of this contention by examples taken from the whole range of history and from nearly all parts of the world. After a brief preface in which these ideas are briefly set forth he plunges right into his subject, and, confident of the essential interest attaching thereto for those who will take due pains to follow him, he does not hesitate to begin with the remote history and geography of China in spite of the added difficulty thus created for, we may be sure, the majority of his readers through their want of familiarity with the events, the dynasties, and the names of regions and places mentioned. From China, following so far as practicable an historical as well as a geographical order, he passes to India, Persia, Mesopotamia, Italy and the Roman Empire, France, Germany, Holland, Denmark, Russia, the Spanish peninsula, Great Britain, North and South America, and winds up with Japan, apparently reserving that country for the last because in that section he deals chiefly with the capitals of modern Japan, though he takes the opportunity to look back on the early history of that country also.

Included in the chapter dealing with imperial capitals in Italy there are two sections on subjects suggested to the author by his handling of his matter up to that point, one on what he calls the Isothermal Frontier of Ancient Cities, the other on Imperial Capitals in the Marmora Region A.D. 330–1918. The former, an abridgment of which was read at the Hull meeting of the British Association and afterwards published in the January number of this *Magazine* this

year, is illustrated in this volume by a sketch-map showing this frontier—the line dividing the cities of brick and stone to the south from habitations in the form of wooden huts or tents to the north, and found by the author to be almost coincident with the true annual isotherm of 48·5° F. (pp. 73-74). The author, however, expresses no confidence as to the significance of this coincidence. He remarks indeed as a well-known fact "that a colder winter is roughly compensated in the matter of agricultural production by a hotter summer," but it has to be remembered that as we go eastwards in either of the northern land masses the severity of winter cold increases much more rapidly than the strength of summer heat. The fact is that, except as excluding altogether those forms of vegetation that cannot stand severe cold, the severity of winter has no direct effect on vegetation. If the summers are warm enough and long enough crops will flourish if they get the necessary moisture. This section accordingly does not appear to be among the most important in the volume, but the other on the Marmora capitals is exceedingly interesting and is rendered much easier to read than most parts of the book by the accompanying sketch-map. Incidentally it may be mentioned that Dr. Cornish gives no countenance to the oracle of Apollo which directed the founders of Byzantium to build their city opposite the city of the blind. It required an empire to turn to account the advantages of the site of Constantinople (p. 90).

Among the suggestive and sometimes penetrating geographical hints which abound in the volume, the following may be noted: the mention of cement-making materials in the neighbourhood as one of the advantages of the site of ancient Rome (p. 64); the advantage that accrued to Persia when it added the wealth of the Babylonian storehouse to the strength of the Persian highlands (p. 45); the ingenious statement of a climatic reason for the establishment of a Mediterranean civilisation in ancient Dacia on both sides of the Transylvanian Alps when there was no such civilisation between the Danube and the Balkans (p. 77); the warning against postulating a racial cause for the military incompetence of the Slavs against both the Germans and the Magyars seeing that their geographical position deprived them of the opportunity of acquiring military experience which different geographical conditions had enabled both those enemies in one way or another to acquire (pp. 145-146); the advantages enjoyed by the Iberian Peninsula in relation to the winds by which the Atlantic could be crossed (p. 207).

Finally, it may be noted that the wide range in space and time commanded by the author enables him to point out many striking historico-geographical parallels, as, for example, between the shifting of Kublai Khan's capitals and that of the capitals of the Roman Empire (p. 69); the tendency to the development of masonry fortifications in Transylvania and in early days in Italy (pp. 76-77); between Italy and Korea (86); between the advance of the capital of the Salian Franks and that of the Persians in the foundation of Susa by Darius

(p. 109); the correspondence of the gap that had to be defended by Syagrius at the end of the fifth century with that defended by the French against the Germans in 1914–18 (p. 117); the comparison between the transcontinental routes across Europe and those from the Persian Gulf to the Levant (p. 131), between the commerce in amber in ancient days and that in diamonds in modern times (p. 71), between the barriers of dense population in southern Russia and in China along the banks of the Yellow River (p. 189), between the situation of the Inca capitals and those of the Iroquois.

It is to be hoped that this important volume will meet with so much success as to encourage the author and publishers to bring out a new edition with more maps like that which illustrates the capitals of the Marmora region.

GEOGRAPHICAL NOTES.

Europe.

Studies of the Flora of the Alps.—We may note, without attempting to give abstracts, two publications recently received dealing with the mountain flora of the Swiss canton Valais. One, entitled "Le Valsorey," by M. Henry Guyot, forms a supplementary issue attached to Part XXIX. of the *Bulletin de la Société Botanique Suisse*. It is a detailed study of the geographical and ecological botany of the valley named, which is a lateral tributary of the Dranse d'Entremont, entering that stream at Bourg St. Pierre, the last village on the Swiss side of the Great St. Bernard Pass. The Valsorey stream takes its origin in a glaciated region lying between the Grand Combin and the Vélan, and has a rich flora. M. Guyot has studied this flora in much detail, and as the valley lies close to a frequented route, his pamphlet, which can be purchased separately, will prove of much value to the tourist with botanical tastes. It includes a brief topographical and geological account of the region studied.

The other pamphlet is by Professor R. Chodat of Geneva, is extracted from the *Echo des Alpes*, No. 12, 1922, and gives an extremely interesting account of the small Alpine garden "Linnæa," which is placed close to the highroad to the Great St. Bernard, at the village of Bourg St. Pierre. Since 1905 a laboratory of Alpine biology has been attached to the garden, in which places are available for Swiss and foreign students. In addition to Alpine plants in the literal sense the garden contains a fine collection of mountain plants from all parts of the world, and annotated catalogues are available.

The Calcareous Alps of Faucigny.—In the high Calcareous Alps of Haute Savoie, Faucigny, there is an interesting stretch of country lying between the Buet to the north-east and the curious "desert of

Platé" to the south-west. The region is dissected by two valleys, that of the Sales torrent to the west and that of the torrent of the Fonts to the north, which heads in a great cirque. The two streams unite south of the village of Sixt to form a stream which joins the Arve, and their valleys afford access to two well-known passes, the Col d'Anterne, forming a route between Sixt and Chamonix, and the Dérochoir, which connects Sixt with Servoz. The beauty and interest of the scenery, due especially to the great development of limestones, have attracted tourists and scientists from early days, but no very satisfactory large-scale map has hitherto been available. Dr. Robert Perret began in the year 1911 the task of carrying out a survey with the object of producing a map on the scale of 1 : 20,000. This map was published last year by M. Henri Barrère, Paris, accompanied by a descriptive pamphlet containing a general account of the area, illustrated by diagrams, and some fine photographs. The map has more than a purely local significance, for the author has attempted to show, by special symbols, the lithological characters of the rocks exposed on the slopes. The chief rocks thus exposed are hard limestones, traversed by deep fissures, schists, and grits, and each of these is indicated by a special symbol. The justification of this novelty on a topographical map is stated to be that the land forms show a close relation to the physical properties of the rocks, and being given that limestones, grits, and schists disintegrate each in a characteristic fashion, it is held that their indication on the map should help the student to visualise the country. So far as the results are concerned it must be said that the method makes it more difficult to obtain a general impression of the area as a whole ; but it does, on the other hand, facilitate detailed studies of special tracts, and is an interesting experiment.

Asia.

The Resources of Asiatic Russia.—Professor P. P. Goudkoff, formerly Professor at the Tomsk Technological Institute, Siberia, contributes to the *Geographical Review* for April last an article on the natural resources, especially the coal resources, of Asiatic Russia, which contains a number of useful facts. The article is accompanied by a map, showing the known coalfields, the railways, existing and projected, and the distribution of population in 1914. The author points out that up till the year 1917 the War had rather a stimulating than a retarding effect alike on Siberia and Russian Turkestan. This was partly due to the fact that the population increased owing to the influx of refugees from the western provinces of European Russia, and it was population chiefly which was required to develop the Asiatic territories. Since 1917 there has been a further influx of refugees from the famine areas, and if social and economic tranquillity were only assured it is probable that rapid development would take place.

In Siberia a considerable amount of exploration has been carried

out since the War, which shows that the coal resources are far more extensive than was believed in the pre-war period. It is now estimated that the total coal resources of Asiatic Russia amount to over 400,000 million tons, the most important deposits being in southern and central Siberia, near the Trans-Siberian railway. The most important field is that near Kuznetsk. It is believed that in the near future this field could be made to yield ten million tons per annum. The Irkutsk basin covers a larger area, and it was here that coal-mining was first carried out on any scale in Siberia. The fact that the railway runs through the field for over 300 miles is a great asset; but much of the coal would appear to be lignite, and the beds are less valuable than those of Kuznetsk. Many of the other coalfields contain deposits of inferior value, but those of the island of Sakhalin are said to be good, though the absence of suitable harbours makes export difficult.

As to the uses to which the coal could be put, in addition to the amounts which would be required if the necessary development of the railway system took place, it would be possible to use coal instead of wood on the river steamers, to develop local metallurgical industries, to use the coal of the west for iron-works in the Ural region, and also to develop a large flour-milling industry in the wheat area.

Africa.

The Southern Territories of Algeria.—In the *Revue Générale des Sciences* for February last M. Pierre Clerget summarises, from an official publication, some of the main facts in regard to the territories lying to the south of Algeria proper. These lands include a small portion of the Saharan Atlas, but for the most part lie within the Sahara Desert. The total area is about 500,000,000 acres, but the population does not much exceed half a million. Not more than 300,000 acres can be cultivated, of which about 175,000 acres are capable of bearing cereals, chiefly barley. But of the total not more than half is sown in any given year, and the yield is small. Some 125,000 acres are devoted to the date palm and to gardens. In the latter a variety of vegetables are grown, and a certain number of fruit trees, including the olive and citrus fruits. Industrial raw material is represented by some tobacco and a small amount of cotton.

In addition to these cultivated lands an area estimated at about 50,000,000 acres produces steppe plants, notably alfa, suitable for the grazing of sheep, goats, and camels. In 1921 there were nearly one and a quarter million sheep, under half a million goats, under one hundred thousand camels, and a small number of cattle. The animals belong for the most part to the nomads, but there is a very definite economic relation between these nomads and the inhabitants of the oases, without which neither could live in this barren land. The peoples of the oases have a small surplus of local products, consisting for the most part of dates, over seven million date-palms having been counted in the

territories. In addition to dates, small amounts of tobacco, dried vegetables, and locally manufactured goods are available for export. But the three short existing railway lines and the automobile service are useless as means of communication save in limited areas. Trade is therefore carried on by means of the camels of the nomads, which transport alike the dates and the limited amount of imports, chiefly food-stuffs and manufactured goods, required by the inhabitants of the oases. A point of some interest is that since the opening of the railway line from Biskra to Tuggurt date plantations under European control have appeared within the area served by the line. The product in this case is purely for export, not primarily for local use.

The Flora of South-East Africa.—Prof. J. W. Bews, of University College, Natal, published in the *Annals of Botany* for April 1922 a paper on the origin, migrations, and evolutionary tendencies of the flora of South-East Africa, which, in addition to purely botanical matter, contains much of geographical interest. He recognises three floras in the area: (1) a purely tropical one on the coast-belt, which is a southerly extension of the tropical flora of Central Africa; (2) a derived sub-tropical flora, adapted to drier and cooler climates, which becomes increasingly prominent towards the south on the coast-belt, and occupies most of the region of rising altitude (1500 feet and upwards) away from the sea; (3) a mountain or temperate flora, which occupies the higher altitudes (8000 feet and over) on the Drakensberg and other mountain ranges, descends to sea-level in the south-western region of the Cape, and connects through the mountains of Central Africa with the temperate flora of the Northern Hemisphere.

It seems fairly clear that (2) has been derived from (1) in response to local conditions in South Africa, and some interesting details are given in regard to lines of migration. Before dealing with these, a word or two may be said as to the origin of (3). Since the whole of the eastern side of Africa forms an elevated region, the heights being continued westward across the southern end of the continent to the Cape Peninsula, which lies within the Mediterranean climate belt, the existence of a temperate or mountain flora, at great elevations in the inter-tropical area, and at sea-level in the Cape Peninsula, is easily explained. But the origin of this flora is still a debated point. It is naturally richest in South-West Cape Colony, where, as just stated, it comes down to sea-level. Eastward, as soon as the area of summer rain is reached, it is entirely a mountain flora, and is poor in species. Two possible explanations of its origin have been given. According to one view, it is of northern origin, and has travelled southwards across the equator by means of the highlands. On reaching South-West Cape Colony it found especially favourable conditions, and there underwent rapid evolution, producing the characteristic Cape flora. The other view is that the Cape flora is a remnant of one which once occupied a vanished Antarctic Continent, whence the affinities with those of Australia and

South America, and the presence of a few of its members in the Drakensberg and elsewhere is explained on the hypothesis that it has recently extended its range. Prof. Bews considers that the evidence is insufficient to permit of definite conclusions being drawn, but appears to incline towards the first view.

The relations of the tropical and sub-tropical floras form a much simpler problem. There is very definite evidence of migration southwards of African tropical plants into the sub-tropical region along the coast-belt. In so far as the species concerned are strand plants, or inhabitants of coastal sand-dunes, or of mud lagoons, the seeds of all of which are capable of tolerating immersion in sea-water, the only check to migration would appear to be a temperature one. The warm Mozambique current raises the temperature of the coastal waters, and helps to account for the distribution of, *e.g.*, mangroves. But there is also a much less marked and variable cold counter-current, which often kills tropical fish, and must have a marked effect on vegetation.

As contrasted with the species which live on the actual shore-line, the inland forms have a less easy task. If the coastal plain is regarded as the land under 1000 feet in height, it will be seen that it is hundreds of miles wide in Portuguese East Africa, but is narrowed to a bottle-neck at Port Durnford in Zululand. South of this point also, the low, broad sandy belt of the north is represented only by a strip a mile or two wide in Natal. This change in the topography renders migration difficult, and presumably slow. Another factor comes, however, into play in the deeply cut transverse river valleys which cut through the highlands. These valleys are dry, with extremes of temperature, but form natural highways of migration, especially for African trees and shrubs which have mostly fruits and seeds distributed by birds and other animals : for these use the valleys as feeding grounds and lines of migration. Thus the intermediate region between the coast and the greater heights has obtained its special flora in two ways. To a certain extent there has been direct movement of tropical species up the river valleys. Again, much modification of form and structure has taken place as the result of adaptation to the drier climate and more extreme temperatures, giving rise to a local sub-tropical flora with tropical affinities.

The Coasts of Madagascar.—In *La Géographie* for February last there appears a brief report of a lecture by M. G. Petit on an expedition undertaken to study the sea-fisheries of Madagascar. It is pointed out that these increase in importance as one travels from the east coast to the north-western one, and from the latter to the south-west. On the east the sea is often stormy, and is almost deserted. The natives have little energy, their chief activity being the cultivation of rice. But since this is carried on extensively rather than intensively, the people are nomadic or semi-nomadic. The north-west coast is very different. Here the continental platform is wide, the sea calm, islands numerous, winds regular, and all the conditions favourable for a con-

siderable fishing industry. Pearl oysters are obtained, but it is noted that the best pearls are exported to Ceylon, and then resold to Europe as Ceylon pearls. Similarly, the best of the precious stones of Madagascar are sent to Brazil, as it is found that a better price is obtained than if they are put upon the market as having originated in the island.

In the south-west the coastal people are even more definitely seafarers, taking to the water at a very early age. The coast generally is dry and melancholy, like most of Madagascar, but behind the sand-dunes of Tulear there is a fertile plain, now well irrigated. All the rivers also of the west and south-west enter the sea by deltas which are remarkably fertile, and have a considerable agricultural future before them. Towards these plains there is now taking place a considerable migration of groups who were formerly pastoral nomads.

America.

A Week on Aconcagua.—Mr. R. Cochrane has forwarded to us a reprint from the *Central Argentine Railway Magazine* containing an interesting and vivid account of an attempt to climb the highest summit of the Andes, made last January by a party of which his son, Mr. James Cochrane, B.Sc., was a member. The attempt was unsuccessful, but a height of 21,000 feet, or 2000 feet below the summit, was attained by one of the party, and many interesting observations were made. Only two successful ascents of Aconcagua have so far been recorded, that by members of the Fitzgerald expedition in 1897, and that of Mr. Helbling, a Swiss, in 1906. The difficulties are obviously great, but are due entirely to physiological causes, especially want of sleep and the problem of obtaining hot cooked food; there are no technical climbing problems to be faced.

The party consisted of Mr. M. F. Ryan, C.B.E., A.M.I.C.E., chief mechanical engineer on the Central Argentine railway; Mr. Cochrane, who is one of his assistants; and Mr. Eric Pilditch, of the Transandine railway.

The start was made from Las Cuevas, the summit station of the Transandine railway. A week was spent at the little inn here, in order that the party might make the final arrangements and get into training. From this point they rode twenty miles up the Horcones valley to establish a base camp beside the glacier at its head. Two pack mules carried the equipment, and were accompanied by a Madrina or bell-mare, with a Chilian guide in charge. The Cuevas valley was first followed to its junction with the Horcones. At the mouth of the latter valley there is a spring-fed lake, giving rise to luxuriant pasture land, sprinkled with wild flowers, especially calceolarias. The Horcones carries a heavy load of reddish silt, which, far below, helps to fertilise the sands and gravels in which the Mendoza vineyards flourish. The valley walls consist of mingled volcanic and sedimentary rocks, and it is the presence of the former, which are relatively soft beds, that

accounts for the way in which the Cuevas and Horcones rivers, rising in the western chain, have been able to cut their way through the central Andes chain, which carries the peaks of Aconcagua and Tupungato.

Camp was pitched at 14,200 feet, at practically the limit of vegetation. The last notable plants found were a kind of gorse, yielding firewood, and a compact, tap-rooted herb belonging to the violet family.

On the following day one member of the party undertook a reconnaissance climb to 19,000 feet, where the site of the Fitzgerald camp was identified. After a day's rest the main attempt was made, but one member of the party was compelled to turn back soon after starting on account of mountain sickness. Another fell out at 17,000 feet. Mr. Ryan succeeded in reaching the camp at 19,000 feet, and spent there an almost sleepless and bitterly cold night. The next morning he succeeded in reaching a height of 21,000 feet before being compelled to abandon the attempt. A fine view of the peak Mercedario was obtained to the north, but the view on the Chilian side was obscured by clouds.

General.

Classification and Method in Geography.—So many attempts have been made to define precisely the meaning and scope of geography, and so much divergence of opinion has manifested itself, that many geographers are disposed to regard the topic as one upon which nothing more can profitably be said. This feeling may lead some to neglect an article of outstanding importance which has recently appeared. This is a paper (in English) by Dr. Sten De Geer of Stockholm entitled "On the Definition, Method, and Classification of Geography." The article appeared in *Geografiska Annaler*, 1923, H. 1, and a reprint has been recently sent to us. The importance of the article lies less in the definition given, which is indeed but a variant of that adopted by Dr. H. R. Mill in *The International Geography*, than in the detailed discussion of method and of classification which is based upon it.

Dr. De Geer's definition, in its fullest form, is that "Geography is the science of present-day distribution phenomena on the surface of the earth. It aims at a comparative and explanatory description of the characteristic complexes of important distribution phenomena—geographical provinces and regions—which occur on the earth's surface." In this definition the words "distribution phenomena" are regarded as the essential ones, in that they define the specific character of the science as the special science of space. A brief note on the meaning of the word "surface" is given. It is argued that it is rare to find geographical interest extending even so far as 1 kilometre within the solid lithosphere. On the other hand, the whole of the water layer must be included, and also that part of the atmosphere which has the same general characters as the part nearest the earth. According as the

outer limit of the atmosphere is defined, whether on the basis of the percentage of oxygen or of hydrogen, the total thickness of the surface layer of the earth, which is the theatre of geographical phenomena, will vary from 82 kilometres to 17 kilometres.

The next point is that since distribution phenomena must be regarded as abstract qualities, that is general qualities or circumstances in the material objects, geography by its very nature is non-material and abstract. This is an important distinction from the natural sciences, which deal with material objects.

A very important section is then devoted to the map, in which it is pointed out that atlas maps are still mainly orientation maps, and that the synthetic geographical map has yet to be created; for many of the important factors which go to make up a landscape are unrepresented in atlases.

In considering classification, Dr. De Geer points out that either *distribution phenomena* or the *surface of the earth* can be taken as the basis. In other words, one of two questions may be asked:—(1) What are the different kinds of distribution phenomena which the geographer has to investigate? or (2) What are the different parts of the earth's surface that have to be investigated? The answer to the first question would be a complete inventory of geography, arranged as what is called general geography, but would be better termed planetary geography, inasmuch as the whole surface of the planet is surveyed. The answer to the second question also embraces the entire content of the science, but arranged as special or regional geography. Planetary and Regional classifications are then given, following more or less familiar lines, with some interesting modifications. Thus in the former we have A, the Atmosphere; B, the Hydrosphere; C, the Lithosphere; D, the Biosphere. Man is removed from the Biosphere and relegated to E, the Anthroposphere, and adopting a sub-division used in A, B, and C, a distinction is drawn between the distribution of Material and of Energy in the Anthroposphere. Thus Man is regarded as the "material" concerned in the geography of population, while Energy here is human work, so that Economic Geography is considered under this section. Finally, under F, a section is added devoted to the theory, technique, nomenclature, and history of Geography.

Space does not permit us to summarise the Regional Classification, which is illustrated by a sketch-map. It may be sufficient to say that the author recognises 27 terrestrial and 17 maritime regions, altogether 44 main regions, and gives names for these. The treatment here seems to us very suggestive, and the whole paper may be strongly recommended to the notice of geographers.

Death of Captain F. B. Napier.—Dr. R. N. Rudmose Brown sends us some notes on the late Captain Frank Bryce Napier, who died at Leith on June 19, 1923, in his sixty-fifth year, and was well known for his extensive and accurate knowledge of Spitsbergen. Captain

Napier's early career was adventurous, for he voyaged in sailing-ships trading with Australia and China. After a period spent in vessels trading with India, he entered the service of a Leith firm with a North Sea connection, and for many years was well known in Baltic and Elbe ports. Throughout the War he was at sea in the North Sea and English Channel and navigated his vessels with conspicuous daring and success. In 1909 the late Dr. W. S. Bruce wisely chose Captain Napier to command the *Conqueror* on a voyage of exploration to Spitsbergen. In 1919 he took the *Petunia* and in 1920 the *Easonian* to Spitsbergen on behalf of the Scottish Spitsbergen Syndicate. His keen interest in exploration and the advancement of scientific knowledge of Spitsbergen is commemorated in Point Napier on Prince Charles Foreland and Cape Napier in Klaas Billen Bay.

The Origin of Mountain Chains.—Under the title of "The Surface Movements of the Earth's Crust," Professor J. Joly recently delivered a lecture which, with much vivid phrasing, sums up what is at present known or assumed in regard to the origin of folded mountain chains. The lecture is reported in *Nature* for May 5 last, from which the following abstract is taken.

The paper as printed begins with a brief account of the actual phenomena of mountain-forming, as deduced by Suess and others. To the whole series of processes, beginning with the transgression of the seas over the continents, and ending with the rise of new mountain chains from the geosynclines or earth-troughs in which great masses of sediment had been deposited, Professor Joly gives the name of world-revolution. It is pointed out that geologists recognise some four or five such world-revolutions, and that there is some evidence that thirty or more millions of years are required for the genesis and consummation of each.

There follows some reference to the theory of isostasy (cf. p. 121), leading to the conclusion that the yielding substance which buoys up the oceans and continents must be basalt. Now basalt contains small quantities of radio-active substances, which continually evolve heat. The conclusion then drawn is that because of this evolution of heat the basalt, in the course of some twenty-five million years, has its temperature so raised as to change from a solid to a liquid. Since expansion must then occur, with a change of density, the isostatic equilibrium will be disturbed, and the continents will sink a little, thus accounting for the transgression of the sea over the lands. But in the course of time the liquid basalt loses its heat more rapidly than radio-activity can supply it, probably through the floor of the ocean, assumed to be also of basalt. In course of time, therefore, the basaltic magma returns to the solid condition. The result is that the continents rise again. The fact that as they rise folded mountain-chains, with the associated sinking of earth-blocks, take their origin in the geosynclines is assigned to greatly intensified tidal phenomena in the dense but fluid

magma, with a corresponding lag at the surface. Some detailed consideration is then given to the question why some mountain ranges, like the Cordilleras of North and South America, run north and south, while others, like the Pyrenees and Himalayas, have an east-to-west direction. The latter are ascribed to a small amount of continental drifting, a slight turning movement. In the final brief summing-up the statement is made that the energy which brings about "world-revolutions" is derived from radio-active bodies and from the rotation of the earth. The paper, of which this is a very brief summary, is worthy of careful study.

EDUCATIONAL.

The Scottish Central Library for Students.—A Note on this subject appeared in our January issue, p. 43. We have subsequently received a Report of a Conference held at Stirling on June 7 and 8 last. As a result of this Conference the Trustees of the Carnegie United Kingdom Trust have resolved to extend the operations of the Scottish Central Library for Students to cover residents in municipal library areas, who were hitherto excluded, as well as in rural districts administered by County Education Authorities. By this means readers in the smaller towns will be able to obtain serious books which are not represented in the local library, and cannot be added to it on account of lack of funds. The Trustees are anxious that the fact that the operations of the Library have been extended should be as widely known as possible, and the documents which set forth their new policy can be consulted in the Society's Library in Edinburgh.

NEW BOOKS.

EUROPE.

La Vie Pastorale dans les Alpes Françaises: Étude de Géographie Humaine. Par Philippe Arbos, Docteur ès lettres. Paris: Armand Colin. *Prix* 28 *fr.*

As the title indicates, this bulky volume has a double aim. It is, in the first place, one of those detailed regional studies to which the French geographers have accustomed us: at the same time, the local facts are utilised as the basis of a broad general discussion of the relation between man and nature in mountain regions. Many of the local details, it may be said at once, have but a minor interest for geographers outside France. The book is nevertheless one of great value and importance, and treats the whole problem of mountain life in a most suggestive fashion. It is illustrated by two coloured maps, a large number of sketch-maps and diagrams, and from photographs, and has a lengthy bibliography and an index.

Much stress is laid upon what is described as the agricultural revolution at the close of the nineteenth century. This had two main causes, the steady depopulation of the French Alps and the development of lines of communication through them. Till last century the Alpine peoples were necessarily compelled to combine

the pastoral industry with agriculture, because the difficulty of communication made it necessary for them to be self-supporting. The climate and relief were unfavourable to cereal production, and the necessity for reserving the best lands for human food diminished the supplies of fodder for the animals, and thus affected the pastoral industry, which was that best adapted to the area. The result was that the mountain lands were worked to exhaustion, and yet could not feed the inhabitants and their flocks. In consequence, intensive emigration took place, and as this coincided with the development of roads and railways, it became possible to import food for the reduced population and to export dairy products and meat. One consequence has been that the sheep is almost everywhere yielding place to the more valuable cow. At the same time, the destruction of forests, bringing in its train the destruction of pasturages by erosion, is ceasing, and towards the year 1914 a new condition of equilibrium was in process of establishment. Thus the point of most general interest which emerges is that the French Alps cannot support a self-sufficing population on a reasonable standard of life. A systematic exploitation of the natural wealth in pasturage, combined with a modern development of communications and trade relations, on the other hand, enables them to maintain a considerable population in comfort. The mountain, that is to say, is losing its archaic character of an area apart, and becoming a portion of a whole.

Space does not permit of a further discussion of the numerous interesting points raised, but we recommend the book cordially to students of geography on its human side.

L'Allemagne: Lendemains de Guerre et de Révolution. Par Maurice Baumont et Marcel Berthelot, Agrégés de l'Université. Avec une Préface par Ernest Lavisse. Paris: Armand Colin, 1922. *Prix 7 francs.*

This is a sober and painstaking study of post-war Germany, based upon observations made within the country during the period from 1919 to 1921. The book is furnished with a short bibliography, and deals with political, social, and economic questions. The authors' conclusion is that there is a new spirit in Germany, and that the result of the revolution is that a certain number of reforms have been already realised, and that progressive modifications are taking place; though these necessarily arouse less attention outside the country than the noisy manifestations of the military and reactionary party.

Of special interest is the section on agriculture, which has been little affected by revolutionary reforms. It is noted that no division of the great estates of the eastern part of the country has taken place, the large proprietors having so far successfully defended their estates against tentative efforts to establish peasant freeholders. Part of the reason is that the members of the socialistic syndicates of the towns are definitely opposed to peasant proprietorship, as they consider that the future socialisation of agriculture, to which they look forward, would be impeded if small freeholds existed. Meantime agriculture, in the limited sense, is far less productive than before the War, fertilisers and labour being both costly. On the other hand, live-stock raising is highly profitable, and the ravages made by the War in the stocks of cattle, sheep, and pigs are being rapidly repaired. Nevertheless the supply of milk to the towns is inadequate. This is due less to the absolute number of cows than to the fact that oil-cake and other feeding materials necessary for dairy cattle have to be imported and are very costly. The fixing of maximum prices for milk meant only that the peasants refused to sell it, preferring to make butter and cheese, or to use it to fatten pigs. The feeling between town and country is in consequence strong. It is noted that on the one hand the

exodus from the country to the towns has completely stopped, yet on the other hand there is no notable reversed flow from the town to the country. Rural wages remain low, and, even if small holdings were available, the cost of building, of farm-stock, of materials and implements, is so high that it is almost impossible for the townsfolk to establish themselves on the land.

The Peoples of Europe. By Herbert John Fleure, D.Sc. London: Oxford University Press (Humphrey Milford), 1922. *Price 2s 6d.*

This is one of the series of small handbooks in course of publication by the University Press, of which we have already reviewed several here. Their appearance may be said to be an important event, as marking a stage in post-war recovery. The present volume is an original and thoughtful contribution to present problems, and that it has been produced at so moderate a price, while being well printed, neatly bound, and adequately illustrated, is a fact of which its producers may well be proud. Nor should we fail to give a generous measure of appreciation to its author, who has spared no labour and given of his best, including a mass of material which might easily have been used to make a dozen books of the same size. Our only fear is that the compression necessary to discuss the whole subject within the compass of not much over one hundred pages will prevent the book being read as widely as it should be. It is undoubtedly difficult reading, largely perhaps because the geographical background is taken for granted, and not even sketched in. Professor Fleure may of course say that by this time the essentials of the geography of Europe, as formulated by modern geographers, ought to be common property; but we are inclined to doubt if the assumption is as yet justified. The book, as just hinted, is not geographical; it represents an attempt on the part of a geographer to discuss the social, political, and economic problems of present-day Europe, from his particular standpoint, without definite formulation of that standpoint. It will thus appeal most to those who have already a wide acquaintance with modern geographical literature. We hope that in the future Professor Fleure will expand his book into the large volume which the importance of his subject-matter demands.

The Wirral Peninsula: An Outline Regional Survey. By W. Hewitt, B.Sc. The University Press of Liverpool. London: Hodder and Stoughton, Ltd., 1922. *Price 7s. 6d.*

In 1918, on the initiative of Professor Roxby, the Liverpool and District Regional Survey Association was formed to study an area within a radius of 15-20 miles of Liverpool. Meantime, however, the Association is confining itself chiefly to the peninsula of Wirral, between the estuaries of the Dee and Mersey. The present book is intended both to set forth what is already known as to the region and to indicate the lines along which future research may be profitably directed. It is illustrated by maps and diagrams, gives a number of references, and while of special value to workers and residents in the neighbourhood, is not without a wider interest.

Historical Geography of the Weald Iron Industry. By M. C. Delany. London: Benn Brothers, Ltd., 1921. *Price 4s. 6d. net.*

We have here the first of a series of (research) monographs which is to appear under the editorship of Professor Fleure and under the auspices of the Geographical Association. The editor's preface states that the series is intended to give the results of new and fresh work of "geographical nature," but the interpretation of

the province of geography is to be liberal, as a protest against over-specialisation. The idea of such a series is most welcome, but we venture to think that geography is at the moment in need of just this strict interpretation of its content. The first volume of the series strikes us as being somewhat overburdened with consideration of the forests of the Wealden area. There are three maps, which are beautifully clear if somewhat divergent in unessential details, an appendix, giving the details of forests and prices of iron at various dates, and a list of references, but no index.

Le Royaume des Serbes, Croates et Slovènes. By Albert Mousset. Paris: Bossard, 1921. *Prix* 9 *francs.*

This is a general account of the extent and constitution of the Yugoslav kingdom, its social, industrial, and financial condition, and while of great interest to the geographer, it is not geographical in aim or method. It is an optimistic account of a region of great economic resources, whose development is in the very initial stages. Its problems are many and difficult: the unifying of a set of components systematically isolated even by their systems of communication; the conversion of vast private estates, usually in alien hands, into peasant holdings; economical exploitation of great forest resources, reforestation of destructively exploited forests; prospecting and exploitation of extensive and varied mineral resources; development of a uniform system of communications; reorientation of the political axis of the state, which runs north and south, transverse to the economic axis. Add to these a heavy and increasing burden of debt, a problem of devastated areas. Yet we have a people courageously facing these problems, showing confidence in their future by providing capital—it comes even from provinces which are not enthusiastic about the constitution of their state—and a rate of exchange which is certainly less favourable than that of Prague or Athens, but infinitely better than that of most of the new states. The book contains neither maps nor index.

Album Panoramique du Mont Blanc. Par Paul Helbronner. Annexe du tome second de la description géométrique détaillée des Alpes françaises. Paris: Gauthier-Villars et Cie, 1921. *Prix* 250 *francs.*

The Society has been presented with a copy of this beautiful album of coloured photographs of the chain of Mont Blanc, which includes views of the whole circle of the horizon as visible from the summit of the peak, and also a series of views of it taken from neighbouring mountains and view-points. The individual plates reach a size of about 18 in. by 25 in., and in addition to giving a clear picture of the whole chain are sufficiently detailed to show many interesting features of the topography of a glaciated area. There are, for example, a number of excellent examples of bergschrunds, of arêtes, and of the characteristic aiguilles. The sequence of the plates produces a cumulative impression which one does not get from isolated photographs, and a careful study of them, with the help of a large-scale map, will give even to those who have not visited the region a definite and precise appreciation of the characteristic land-forms.

Un Tour sur le Dogger-bank. Par Henri Malo. Paris: Bossard, 1918. *Prix* 3 *fr.* 90.

The author of the book deplores the fact that despite the length of the French coast-line sea-fisheries contribute little to the wealth of the country, or at least much less than they should. The number of French fishermen is stated to be

approximately the same as that of British, but the value of the fish caught off the coasts of the latter country is twice as great. M. Malo regards this as largely a matter of want of proper organisation on the part of his fellow-countrymen. In order to study English methods he made a trip in the southern part of the North Sea from Grimsby as a base, returning to the Thames to see the market at Billingsgate. Illustrated by a plan of the port of Grimsby and by eight photographs, the book gives a very attractive account of the fishing industry as seen by foreign eyes.

The Balkans, Roumania, Bulgaria, Servia, and Montenegro. With new chapter containing their history from 1896 to 1922. By William Miller, M.A., LL.D. Third Edition. London: T. Fisher Unwin, Ltd., 1923. *Price 7s. 6d. net.*

This is a member of the Story of the Nations series, which appeared first in 1896. The body of the book would appear to have been reprinted without change, but the supplementary chapter continues the narrative through the stormy period of the Balkan Wars and the European War. Of this chapter it is only necessary to say that it gives a dispassionate and concise account of the complicated events of the last twenty-six years, and that, thanks to the author's long connection with the Near East, he is able to throw light upon certain minor questions which have remained more or less obscure even to the industrious reader of periodical literature and newspapers.

Wanderings with a Camera, 1882-1898. By Erskine Beveridge, LL.D. 2 Vols. Edinburgh: Privately printed, 1922.

Mr. J. H. Beveridge has kindly presented to the Society a copy of this beautiful collection of his father's photographs, issued without text. The majority of the photographs relate to the Highlands of Scotland, but views taken in North America, in Belgium, and in Holland are also included. It is to be regretted that it was found impossible to include short descriptions of the pictures, for those taken in familiar parts of the Highlands illustrate admirably the characteristic features of scenery and relief there. We note especially some of the views of the islands of Eigg and of Staffa as being very striking, while there are others of much archaeological interest. Many of the photographs would make admirable lantern slides for teaching purposes, and all would, we think, have gained in value if a brief descriptive account of the special point illustrated had been added.

The Banks of the Rhone from Lyons to Arles. By Gabriel Faure. Water-colours by Pierre Vignal. Translated by Frank Kemp. Grenoble: J. Rey, 1922.

This is a very charming picture-book of a stretch of country less frequented by British tourists than its interest and beauties deserve. In addition to the water-colour sketches there are a number of illustrations from photographs, and the text deals fully with the historical and literary associations of the riparian towns.

Constantinople: Ses Cités Franques et Levantines. Par Bertrand Bareilles. Paris: Bossard, 1918. *Prix 24 francs.*

As the sub-title of this book shows, it deals not with Constantinople as a whole, but with the "European" townships of Pera and Galata, Stambul not being considered. By a natural extension, also, the lives of the non-Turkish peoples, Greeks, Armenians, and Jews, and the problems presented by the curious juxtaposition of Turk and Christian on the opposite shores of the Golden Horn, are discussed in detail. Pera, says M. Bareilles, is separated from Stambul not only

by the Golden Horn, but by the deep ditch of the Capitulations, and he adds, not without some asperity, that the sympathy which the inhabitants of the former town show, or used to show, for the Turks, is largely due to the fact that they had little direct contact with them, living as they did under a régime of their own. Though the book was written during the War, it has only reached us recently. It necessarily deals with conditions now largely past, but gives a wonderfully vivid picture especially of the Turkey of the years before the Young Turk revolution. There is a plan of Constantinople and a number of small sketches by M. Adolphe Thiers.

East Carelia and Kola Lapmark. Described by Finnish Scientists and Philologists. Edited by Theodor Homén. London: Longmans, Green and Co., 1921.

This is an English translation of a Finnish book first published in 1918. The date and the fact that the area discussed—which lies between the present eastern frontier of Finland and a line drawn from the neighbourhood of Lake Bielo-sero to the R. Dvina—is one of "mixed nationality," will suggest to the initiated its original purpose. But, as the Editor himself points out, the political situation has altered considerably since the book was first published. We draw somewhat belated attention to it here, therefore, not on account of its pleas for frontier changes, but because it gives a detailed description, illustrated by maps, photographs, and statistical tables, of a region in regard to which it is not easy to obtain information elsewhere.

ASIA.

De Zeeën van Nederlandsch Oost-Indië. Uitgegeven door het Koninklijk Nederlandsch Aardrijkskundig Genootschap. Leyden: E. J. Brill, 1922. *Price 21 guilders.*

This bulky volume, which is copiously illustrated by maps, diagrams, and from photographs, consists of a series of articles by different authors, summarising our present knowledge of the Dutch East Indian Seas from various standpoints. Thus the first chapter, by Col. l'Honoré Naber, deals with the history both of exploration and of detailed research in this part of the ocean, including the work of the *Challenger* and of the later expeditions in the *Siboga* and *Bali*. This is followed by a paper by Admiral G. F. Tydeman on the depths of the sea, which is illustrated by a very beautiful bathymetrical map, showing alike the characteristic "deeps," and the extensive shallows of the Java and Sunda Seas. With this paper is correlated one by Professor Molengraaff on the geology of the region, which deals especially with the causation of the existing relief of the sea-floor and the coral-reef problem. Among other sections we note that on the biology of the seas, which is divided into two parts, Dr. Max Weber dealing with animal life, and Mrs. Weber-van Bosse with the plants. The book is published to celebrate the jubilee of the Royal Dutch Geographical Society, and is an admirable piece of work, the maps being worthy of very special note.

A la Conquête des Cœurs. Par Auguste Pavie. Paris: Bossard, 1921. *Prix 30 francs.*

M. Auguste Pavie went to French Indo-China as an official in the telegraph service more than forty years ago. He spent four years at Kampot, a small port in Cambodia, and there entered into very friendly relations with the native inhabitants. His intercourse with them led him on the one hand to believe that it was possible

for the French administrators to arouse genuine sympathy and affection in the peoples governed—whence his rather obscure title—and on the other made him intensely desirous of carrying out journeys of exploration into the interior. He had been ten years in the country before he was able to begin this work seriously, and his results have been already published in a series of volumes under the title of *Mission Pavie*. The present book consists of extracts from these volumes, and has for its object to show how far the author was successful in helping to achieve his own ideal—"that of making Laos a French country with the consent of its inhabitants." The extracts are prefaced by a short appreciation from the pen of M. Georges Clemenceau, and an introduction by the author which has already been published in the *Revue de Paris*. There is a somewhat inadequate map, but no illustrations nor index.

Persia. By Brigadier-General Sir Percy Sykes, K.C.I.E., C.B., C.M.G. Oxford: Clarendon Press, 1922. *Price 7s. 6d. net.*

This book is uniform with Dr. Hogarth's *Arabia*, and may be said broadly to be an epitome of Sir Percy Sykes's large *History of Persia*. The interesting account of Elam which the latter book contains is wholly omitted, but on the other hand the volume is brought down to the present day, and includes three chapters on events since 1914. In these a very interesting account is given of the part played by the author during the War in organising the South Persia Rifles. It is stated also that influenza broke out at Shiraz in June 1918 with startling suddenness, 18 per cent. of the Indian troops and a larger percentage of Persians dying within a few days of the outbreak; but nothing is said of any possible source of infection.

Sir Percy Sykes regards the prospect before Persia in the immediate future as gloomy in the extreme, the Ministers at Teheran having little control over the provinces, which are falling into anarchy.

AFRICA.

On the Edge of the Primeval Forest. By Prof. Albert Schweitzer. London: A. and C. Black, Ltd. *Price 6s.*

This is a most illuminating work, which cannot be too warmly commended to the attention of all who are interested in their fellow-men or discern the importance even from a selfish point of view of cultivating such an interest. It deals with a part of the wet tropics in the immediate neighbourhood of the equator, and the present reviewer has found it the most instructive he has come across descriptive of such a region. The author is a most remarkable man, a learned and acute theologian, a distinguished musician, an accomplished physician, a man of deep and unpretending sincerity, full of sympathy with all manner of men, white and black, educated and uneducated, with discerning eyes yet not given to condemn, a man thus peculiarly fitted to see and feel more than the superficial touches of nature that make the whole world kin. Formerly a professor at the University of Strasbourg, from which he holds a doctor's degree in theology, in medicine, and in philosophy, he came to believe it to be his "life's task to fight on behalf of the sick under far-off stars," and in the year before the War went to the Gaboon colony to a mission station on the Ogowe to take up that task. There he succeeded in getting a hospital built at Lambarene, about 175 miles up the river and two-thirds of a degree south of the equator, and there spent an arduous life in fighting, with an encouraging measure of success, thanks to the great advances in tropical medicine in recent years, the disease and suffering which he vividly describes.

After five years of such labour in such a region it is not to be wondered at that his health should have become very uncertain. He returned home, but finding his health restored in a year or two, during which by concerts and lectures he had managed to obtain further resources for his work, we find him at the close of his volume, dated Strasbourg, August 1920, prepared to go out again with unabated confidence. One would like to quote from the book much that the author tells us as to the conditions and mode of life and characteristics of the people, and how they are affected by the advent of Europeans both lay and missionary, something also of what he tells us about the timber trade of the region, which he had an opportunity of studying during a short residence at the coast necessitated by a temporary ailment. But there is all the less need for this seeing that members of the Society will have much more pleasure in reading it in the book itself (not a long one—176 pp. exclusive of the index). We would only add on this head that on whatever matter he touches the author shows that he is peculiarly gifted with the power of telling us exactly what we should like to know. The volume is a translation, it is not stated from what language, but the translation is excellent, nowhere giving the reader the sense that it is not an original. There is a sketch-map, along with 16 illustrations from photographs. G. G. C.

AMERICA.

Down the Yellowstone. By Lewis R. Freeman. London: William Heinemann, Ltd., 1923. Pp. 282. Illustrated. *Price* 21*s. net.*

Mr. Freeman is excellent company. He possesses a vigorous personality, abundant humour, a love of adventure, and the gift of graphic expression. His experiences in the Yellowstone Park and down the River are admirably told. The book is written, it is true, not so much from the geographical as from the personal point of view, and the reader is in no danger of weariness in the accounts of such characters as "Yankee Jim" or "Calamity Jane." At the same time, the realism in the description of a tornado, the tribute to the glory of the scenes in winter and still more in spring, and the description of the mighty forces of nature operating in this strange region, are well worth perusal. The writer's varied and adventurous experiences on his downstream voyage, though he accomplished it satisfactorily, demonstrate how it ought not to be done.

It is a pleasure to read the following with reference to the character of the Service in charge of the Yellowstone Park: "It seems to me to be developing a type that does not suffer in comparison with that fine idealist, the British Civil Servant, whom I have always admired so unreservedly where I have found him at work in India, the Federated Malay States, and other outposts of Empire—an official of ability and experience giving his lifetime for the good of others for very modest pay. If I knew how to pay a higher compliment I should do so."

The illustrations are numerous and good.

Sporting Reminiscences of South America, 1919-1922: H.M.S. "Southampton." By "Banderas." London: Riddle, Smith, and Duffus.

The author of this book, apparently a naval officer, expressly disclaims any literary merit for this lively account of his travels in search of game and fish, in company with a party of friends released like himself from war service by the peace. The book is based on a diary, and naturally deals for the most part with the method of sport adopted in the different areas visited, the game obtained, and the incidental experiences of the various shoots. But it is written in so direct and unaffected a manner, and the travels cover so wide a range of ground—from the

Panama Canal to Patagonia and from Juan Fernandez to the Falklands—that it can be read by the non-sportsman with pleasure and profit. Many of the minor facts recorded are of much geographical interest. Thus at Junin, on the Peruvian plateau, at a height of 14,000 feet, the party tried, without success, to soften green peas by twelve hours' soaking and six hours' boiling! An interesting account of the effect of mountain sickness in the party is also given. On the Uruguay River they found that the average daily allowance of meat for the peons was five pounds, and some could consume a whole sheep in a day. Their diet is said, however, to consist exclusively of meat and maté. A large number of photographs and some outline maps illustrate the text.

The Question of the Pacific. By Victor M. Maurtua, enlarged by F. A. Pezet. New York: Harper and Brothers, *n.d.*

According to Brunhes and Vallaux, there are four *faisceaux politiques*, and, consequently, four "questions," of the Pacific. The present work deals with part of the fourth in order of importance. It is a "well-documented" statement of the issue between Chile and Peru in relation to the desert territories, from the Peruvian point of view. As the case for a prosecution it is sufficiently damning, and its object is rather the securing of intervention by a Power or Powers. But it is only one side of a question, and the whole matter is a distant one of minor importance.

A Naturalist in the Great Lakes Region. By Elliot Rowland Downing. Chicago: University of Chicago Press, 1922. *Price* $3.50.

The University of Chicago is at present issuing a series of educational books for teachers and pupils, dealing with various aspects of science. The present volume is intended to assist teachers in preparing Nature Study courses, and for out-of-door work generally. We draw attention to it here because the study of vegetation especially is clear, detailed, and admirably illustrated, and, apart from local use as a field-book, the volume contains much of value to the student of American geography.

Inca Land: Explorations in the Highlands of Peru. By Hiram Bingham, Professor of Latin-American History in Yale University, author of *Across South America*, etc. With Illustrations. London: Constable and Co., Ltd., 1922. *Price* 24*s. net.*

This volume is a result of four journeys in southern Peru made under the auspices of Yale University and the American Geographical Society. The most valuable work was done in the exploration and identification of pre-Inca and late Inca sites, but the most interesting from the geographical point of view was the ascent of Coropuna and the survey of Lake Parinacochas. Coropuna had by some authorities been estimated to be higher than Aconcagua, and therefore the highest peak in the Western Hemisphere. Professor Bingham, however, with boiling-point thermometer, barometer, and trigonometrical survey, fixed the height at 21,703 feet above sea-level. Thus Coropuna proves to be a thousand feet lower than Aconcagua, but, as the author says, it is a thousand feet higher than Mount McKinley, and he is proud of having been the first to ascend it. Parinacochas "lake of flamingoes" is eighteen miles long and seventeen miles wide, and is locally reported to be bottomless, but its maximum depth was found to be four and a half feet! Its shores are rather dreary, but the landscape is much brightened by myriads of flamingoes with their black, white, and pink plumage.

Professor Bingham has been able to clear up the vexed question of the last

retreat of the Incas after the coming of the Spaniards. He has dentified beyond doubt the site of Machu Picchu, which may be called their last capital, and he promises another volume to deal more exhaustively with this subject. The book is well written and abundantly supplied with illustrations, but the maps are neither so large nor so clear as we should have liked. Many interesting sidelights are given of Indian life and customs, and we can thoroughly recommend the book as worthily carrying on the work of Prescott, Markham, Bowman, and many other Peruvian students.

The Valley of Ten Thousand Smokes. By Robert F. Griggs, Ph.D. Washington : The National Geographic Society, 1922.

The twentieth century has provided a remarkable example of volcanic activity. Fortunately it was attended with no loss of human life. Fortunately, also, the National Geographic Society of America were enterprising enough to send expeditions to the region of disturbance (Katmai, Alaska) to note the changes wrought by the vast eruption and to discover if possible

"The secret Springs
That lie beneath the surface and the show."

The results observed are recorded in this volume, and Dr. Griggs and the Society to which he belongs have reason to be proud of the work. A series of most impressive and significant photographs illuminates and interprets the letterpress.

Many interesting, controversial, and highly speculative questions as to the origins, course of events, etc., of the upheaval are raised throughout the pages, but sufficient evidence has not been forthcoming to settle any of them. But still the amount of really good work performed by the author and his co-workers, and of evidence collected to show the actual result of the eruption, will give food for thought to vulcanists for a long time. So remarkable is the region that President Wilson decreed that a great part of it should be set aside as a National Park.

That there had been an upheaval was indicated by falls of volcanic ash over parts of America, but it was three years after the explosion (which occurred in June 1912) that the seat of activity was identified as Katmai. It is the first recorded eruption in which a flow of incandescent sand occurred, and this is one of the indications that the usual concatenation of volcanic phenomena was upset. Millions of tons of ash fell, and the remarkable thing about the ash was that it was cool at its time of falling—at least no evidence of its having melted snow on which it fell was found. The Katmai flood was of gigantic dimensions. Probably the most interesting of the results was the creation of the valley which gives this entrancing book its title, and not the least important is the evidence that while great destruction may accompany volcanic outbursts, effects which react favourably on animal and plant life may be observable.

Dr. Griggs writes with clearness, vigour, and reserve, and the book should appeal to the highly trained scientist as well as to the ordinary individual who likes to read a good story in which his appreciation of the curious, awe-inspiring, and wonderful doings of nature is kept "ware and waking."

AUSTRALASIA.

Patrolling in Papua. By W. R. Humphries, A.R.M. With an introduction by J. H. P. Murray, Lieutenant-Governor and Chief Judicial Officer of Papua. London : T. Fisher Unwin, Ltd., 1923. *Price* 21*s.*

With seven native police and a company of Papuan criminals as carriers, Mr. Humphries has managed to penetrate the swamps and jungles which have

defeated so many, has climbed the prodigious mountains of the Chapman Regan, and has made his way through a portion of former German New Guinea to the north coast. He gives an account of his journey, and of several other important explorations in Papua, in his book, which is written without any effort to let the reader know what a terrible time he had. D'Albertis has said that he would rather cross the most difficult mountain in the Alps with only an alpenstock than climb an ordinary hill in New Guinea, and although the difficulties to be met are of a quite opposite kind, this gives the view of an experienced traveller on the relative difficulties of Papua.

Those who had the good fortune to get George Morrison of Peking to talk when he was a medical student in Edinburgh learned something about the impenetrable nature of the Papuan jungle, and the impossibility of getting far inland by ascending any of the rivers near Port Moresby; and one or two magistrates other than Mr. Humphries who wander about this immense island under the inspiration of the Australian Union Jack have told us their experiences amongst the cannibals and murder-loving tribes. Mr. Humphries has carried out a piece of first-class exploration over quite new ground.

The impression is gathered that the former German section, so far as it is yet known, is rather more desirable than Papua. We learn, for instance, of a rich plateau amongst the foot-hills of the German side, 6000 feet above sea-level and about 30 to 35 miles wide; of great rivers, like the Waria, which descends from a height of about 12,000 feet in its course to the sea; of native gardens growing the finest sugar-cane Mr. Humphries has seen; and of most beautiful valleys inhabited by many people.

Describing his first view of some of this country, he says: "Even my prosaic followers agreed that it was 'mamoherea,' or in other words, superlatively beautiful. It seemed to me a pity that such a lovely land should be hidden away in the interior of New Guinea, so far beyond the reach of those suffering from tropical diseases on the coast. Looking on it that morning, I felt sure that Kwolum valley was free from all the diseases of mankind." Contrast this with the Papuan Station of Iona, where the death-rate of natives and Europeans has been as high as 32 per cent., and near which there is a track consisting of rough-hewn planks about six inches wide, placed end to end over many miles of deep swamp.

In the lower country, down the Waria towards Morobe, the villagers fled at his approach. "I was told afterwards at Kasu that they had thought I was a German 'Company man' –a recruiter of native labour. They did not recognise us Government men, as the uniform of my police was of 'another kind.' Company men went recruiting with muskets, and as we had muskets they thought we had come upon the same mission." Mr. Humphries explains elsewhere that the Papuan sees no particular reason why he should labour for other people, since he usually has food and to spare and needs no clothing, and that although he can work well in spells, he dislikes continuous labour. Amongst some tribes also all self-respecting young men have to go off and kill somebody before they can expect to marry.

After enduring the rigours of the high mountain cold, which was very trying to his carriers and police, the whole expedition seems to have been saved from annihilation at the hands of hostile savages by the Providential appearance of a couple of natives who knew Mr. Humphries as not of the German Government, and who were able, at a critical moment, to reassure the tribes that the German method would not be used against them.

The return journey was by a different track on the Papuan side and led the expedition into a region where food was scarce and the population thin. The Magistrate himself was in rags, half his following were lame, the country was extra-

ordinarily steep and difficult, and water was often hard to find. Mr. Humphries always manages to write of these difficulties with a sense of humour, and is clearly one of those Britishers who can get through herculean tasks in the spirit of hardy adventure, who accepts misfortunes as inevitable, and who looks for no reward. With great courage and tact he brought his company through without loss of life.

At times, also, in the book we find a strong sense of kinship with Nature, an appreciation of something which the ordinary man of civilisation would find without interest. As he lies by his fire through the tropical night and waits for the day, "A faint almost indefinable movement in the forest gives the first vague hint that night is nearly done. There is no light in the east, but the unseen creatures of the bush have opened their eyes; Nature has turned in her sleep. It is the first dawn. The moments pass, and the breath of a new-born wind lightly brushes the sleepers at the fires, as it goes to call the sun; . . . Up on his sleeping platform, above the pigs, the native pulls his rug closer around himself and slumbers on. Then the darkness breaks and a pale light comes into the sky; it brightens as the moments pass, until it gathers its force in the east and lights the world. It is the third dawn—the dawn of man. Obediently the master awakens."

W. L. C.

POLAR.

The Northward Course of Empire. By V. Stefansson. Illustrations and a Map. London: George G. Harrap and Co., Ltd., 1922. *Price* 7*s.* 6*d.*

Few men know Arctic Canada better than Mr. Stefansson, and few perhaps love it more. In his *Friendly Arctic* and other writings he has gone to great pains to remove many of the prevalent misconceptions about the Arctic. He will not admit that there is anything heroic or even risky about life in the Arctic. It is pleasurable through and through. Now he wants to convince the world that in the Arctic regions are to be found the great colonisable lands of the future which are going to supply us with enormous quantities of meat, reindeer and musk ox, when other lands are too fully settled to have a surplus. Let it be said at once that Mr. Stefansson makes a very good case, even though it is improbable that he will be able to convince those who do not know the Far North and have not felt its fascination. On the other hand, it must be admitted that his sanguine prophecies can apply only to Canada, parts of the Canadian Arctic archipelago, and Siberia. The remaining Arctic lands are too heavily glaciated or too small in area to have any value as food-producers. No doubt, as far as minerals occur, the Arctic climate will never put a stop to exploitation. It has been abundantly proved in Spitsbergen that, except for a few months' interference with sea transport, the climate actually facilitates the mining, while the mining camps are notoriously healthy and the miners well contented in winter. We fail to follow Mr. Stefansson in his contention that the northern races are no better suited for the polar climate than, say, the Mediterraneans: the examples of the converse which he cites are too few to have any significance. Evidence would appear to support the popular view in this matter, that the Norsemen take kindly to the polar lands, but in any case this does not affect the main argument of the book. The whole forms a closely reasoned thesis in favour of the Arctic's capacity for supporting vast herds of stock. In twenty years it is calculated that Alaska will have an annual reindeer output of some 1,250,000 carcasses, equal to about 3,000,000 sheep. On the same basis of calculation Canada could produce in fifty years' time ten to thirteen million carcasses annually, the equivalent of 25,000,000 sheep, which exceeds the total production of Canada to-day in all forms of domestic meat. The output of

Siberia might be even larger. There is also a chapter on transpolar commerce by air and submarine, but this is less convincing. The book merits close study, and if it goes to a second edition we hope that Mr. Stefansson will expand the treatment of Siberia and revise the section on Spitsbergen. The latter contains many errors, and might be made more striking in support of the author's claim.

R. N. R. B.

Zum Sechsten Erdteil. By W. Filchner. Illustrations and Maps. Berlin: Ullstein, 1923.

The account by its leader of the second German Antarctic expedition has at length been published, with a prefatory note by Dr. O. Nordenskjöld. The *Deutschland* made its base in South Georgia, where incidentally some useful survey work was done at the eastern end, and from there turned its attention to the Weddell Sea. It was the first vessel since the *Scotia* to follow that route to the south. On the way to South Georgia useful oceanographical work was carried on, particularly at St. Paul's Rocks and from Buenos Aires. In November 1911 a cruise was made to the South Sandwich group. Soundings were made round the Traversey Islands, the northernmost of the group, and though heavy seas prevented landing, a close study and survey were made of Savodovski and Lieskov Islands. Candlemas Island was also visited, but again no landing was possible. In December the voyage into the Weddell Sea began. Dr. Filchner, profiting by the experience of the *Scotia*, chose the longitude of about 27° W. The pack edge was met as far north as lat. 58° S. but was safely passed, and the ship met with no serious obstruction. In lat. 76° 40′ S. land was sighted and followed to the south-west. This ice-covered land, Luitpold Land, was clearly a continuation of Coats' Land. The intervening stretch was fitted in three years later when Shackleton discovered the Caird Coast. A great deal of the book, which in other respects is not unduly long, is occupied with the Germans' adventures in the Far South. In lat. 78° they found an ice barrier, since called the Weddell barrier. They dallied here unaccountably, tried to explore to the west, and were driven back by ice, and finally put up a wintering station on the barrier ice which was destroyed when the barrier calved, before it had been occupied. Dr. Filchner then decided to retreat, and early in March headed northward, but he was too late. Bay ice was rapidly forming, and in about lat. 74° S. long. 31° W. the ship was beset. She drifted throughout the winter to the west and north and eventually east, until she was liberated uninjured in lat. 63° 37′ S. long. 36° 34′ W. at the end of November. Full advantage of the long drift, which at the time was the most westerly course in the Weddell Sea, was taken to continue scientific research. The work of the *Deutschland* especially in oceanography was most important. The ship then returned to South Georgia and Buenos Aires, and was used by the Argentine Government to send the annual relief to the meteorological observatory at Scotia Bay, South Orkneys. The book is a welcome addition to Antarctic literature. It is admirably illustrated, especially as regards ice forms and views in South Georgia, and it has a full index.

R. N. R. B.

OCEANIA.

Atolls of the Sun. By Frederick O'Brien. London: Hodder and Stoughton, Ltd., 1922. *Price* 20*s*.

The interest of this book centres chiefly in the Paumotus Islands and the Marquesas, the French possessions in the South Seas.

The former are termed in some maps the Pearl Islands, since some of the most

famous pearls in existence have been won by native divers from the lagoons of the Paumotus.

Some thrilling accounts are given of the diving, for the natives of these atolls are regarded as supreme in their powers of deep diving unaided by artificial means. The author lives for a time with the leading diver of Tetiaroa, and accompanies him in his canoe. He describes one dive to 148 feet with a submergence of two minutes and a half, and states that 180 feet is about the limit. When we recollect that 25 fathoms is a deep dive for a man in a diving dress, and that he is brought up from such a depth very slowly, the performances of the Paumotian divers are amazing. After some deep breathing to expand his air capacity and obtain what a runner would call his second wind, he lets himself slide downwards through the water till he has to turn and swim downwards. If the dive is a really deep one, his shoulder-net for holding the enormous oysters has already been let down on a line. The passage to the surface is made in a few seconds, and, apart from the agony which has to be suffered for some minutes after each dive, this rapid change of pressure is said to become most dangerous at the moment of emerging at the surface—sharks and other death-traps apart.

The water is so exceedingly translucent that, with the aid of a water glass to avoid surface ripples and escape the fierce glare of the sun, the bottom can be searched for shell at a depth of 60 feet.

There is a story here which beats de Rougemont's account of his riding on an alligator, or Waterton's less imaginative tale during his wanderings in South America. A diver rides a large shark for half an hour, tearing its gills all the time, and after many trips between the surface and the bottom succeeds in steering the creature to the shore. The naked diver has naturally been practically flayed by the shark's skin, but he survives.

The Marquesas cannot be called atolls by any stretch of imagination, but the latter part of the book has in it the romance, the heat, the lure, as well as the strange human medley of the South Seas. A chapter is devoted to Paul Gauguin, and the traces of him still remaining in Tahiti and the Marquesas. The author failed to find any trace of his grave, although only ten years had passed since he had been buried among the palms in Hiva-Oa, but the reckless and wilfully elemental life of the painter who, living like a savage, could not live without his French absinth, and died miserably at a comparatively early age, has in it a weird note of interest. "Gauguin here was a name's faint echo, but in America and Europe they bartered for Gauguin's pictures as if they were of gold."

Two Years in Southern Seas. By Charlotte Cameron, O.B.E., F.R.G.S. London : T. Fisher Unwin, Ltd., 1923. *Price* 21*s. net.*

Two years spent in Southern Seas and 100,000 miles of travel are Mrs. Cameron's qualifications for writing this book. Using the beautiful harbour of Sydney as a centre, she has visited Hawaii, New Guinea, Fiji, Samoa, and the Society and Solomon Islands. The information she has gleaned covers many points of interest, as, for instance, the predominance of Japanese in Hawaii under the Stars and Stripes, and her account of the discontent and stagnation in British Samoa due to the administration of the New Zealand Government. She says that there even the former days of German rule are looked back on with regret, and that a petition has been lodged for Crown Colony Government. It is noteworthy that the Solomons have also that ambition. A visit was paid to the Leper Settlement at Molokai, and it is touching to read of the new hope which has come to the victims of that fell disease with the discovery of the healing oil.

Many curious tales are repeated—it may be noted that the writer takes credit

for the stories she does not repeat—as, for example, the indignation of one tribe because they had been ignored by the tax-collector while their neighbours had been privileged to receive a visit from him. There is the tale, too, of the manager of a plantation who secured assiduous work in his absence by leaving his glass eye to keep watch from a tree stump. Hearing sounds not suggestive of labour, he returned to find that a meat tin had been placed over the all-seeing eye.

Inevitably Mrs. Cameron is enthusiastic about the scenes and peoples of these favoured isles. Indeed, her enthusiasm seems to run away with her, and both her style and her statistics suffer. The latter give rise to doubt when, for instance, we meet the statement that America maintains an army of 40,000 in Hawaii, or that an ancient war canoe exhibited in New Zealand could accommodate 1000 men. While the writing is erratic and disconnected, more so in some chapters than in others, there are minor errors for which we cannot think that the printer is to blame. Thus, "cumulous" for "cumulus," "tracks" for "tracts," "matinal" for "matutinal," twice "embrasure" appears for "abrasion," and what is meant by "a white-brigged schooner"? Mrs. Cameron has a taste for what may be classed as anthropology, and in a popular work we might have been spared some of the incidents and the details of native customs which are given. Possibly these blemishes only indicate that she has too fully absorbed the spirit of these southern lands. There are numerous illustrations.

GENERAL.

The Adventures of Imshi. By JOHN PRIOLEAU. London: Jarrolds, 1922. *Price* £1, 1*s. net.*

A spirited account of the six months during which the author drove his two-seater (10 horse-power, 4 cylinders) Morris-Oxford motor car "Imshi" from London through France to Genoa, Marakesh, Kairwan, Gibraltar, Algiers, Biskra, Tunis, Seville, Madrid, Pyrenees, and home through France. The tour began in December 1921 and was undertaken "in search of the sun." With the aid of maps and illustrations from excellent photographs by the author himself, he shows us how, like the magic carpet of romance, a small motor car can carry a man all over Europe and Northern Africa with speed and comfort. The book before us ought to be a *vade mecum* for motorists, for the author gives particulars of every route and road he traversed, passing as he did through localities many of which are much frequented by motorists and through others which offer attractions for future tours. Thus he writes from Morocco, "It is a splendid road from Marakesh to Safi. I am keeping a very careful record of these extraordinary African highways and I see that I have put down 'V.G.' opposite this sketch. I also notice that my average running speed for a whole day's run was about twenty-eight miles an hour, from door to door." The only thing wanting in North Africa and Spain is good, reliable maps, which causes him to exclaim, "I wish Bartholomews, the map-makers, would come south and make decent maps of all the glorious places I have been to. Since I embarked at Marseilles for Morocco I have not come across one road-map which was worth the paper it was printed on. A 'half-inch' contour map of Spain and North Africa would sell for almost any absurd sum."

Legendary Islands of the Atlantic: A Study in Mediæval Cartography. By WILLIAM H. BABCOCK. New York: American Geographical Society, 1922. *Price* $3.50.

Mr. Babcock takes a keen interest in the history of intercourse between the Old World and the New, and, it appears, has been led by it to a study

of the islands accumulated in the North Atlantic in mediæval times from the records of seamen and the imagination of cartographers. In each case he makes a painstaking endeavour to identify names with actual known islands. "Painstaking" is the word. In examining the derivation of names he stresses in several places the interchangeability of *v* and *u* in mediæval writings. His philological technique if not always convincing is often interesting: St. Kilda is the mediæval *Daculi* (of Dalorto, 1325, and others later). *Da* as it occurs in *Zuan da Napoli* (John born at Naples) suggests nativity; *culi* is a mutilation of the plural of *culla*, cradle. Pareto's map of 1455 records that the ladies of Bra (Barra) were unable to give birth to children at home and in due season resorted to Daculi, where they were successful. Variants of the name, besides St. Kilda, are Insul Dach, Insulla da Culli (Beccario, 1435), and others. Pure fictions, "islands of demons" and "saintly islands" have been common enough on maps, but Mr. Babcock seems strangely impatient of them, and his impatience betrays itself in obscure sentences and mannerisms of speech These disappear when he has discovered a plausible connection between a mediæval name and an actual island, because that implies for him an actual westward voyage. Then his interest becomes infectious.

The most interesting of these connections are as follows. Atlantis "was a creation of philosophic romance incited . . . especially by rumours of the weed-encumbered windless dead waters of the Sargasso Sea." The island of Brazil (west of the south of Ireland) is significant because of its later representation as a ring of land about an isle-encumbered sea, or as two islands separated by a meridional strait. It represented the waters of the Gulf of St. Lawrence with Newfoundland (Markland) to the east. Its latitude was right, and the idea that American estuaries were sea channels, and the continent an archipelago, was remarkably persistent. This indicates a pre-Cabotian landfall. Antillia was Cuba, its neighbouring islands Jamaica, Florida, and the Bahamas (I. in Mar, Beccario, 1435): the Portuguese, probably, were here before Columbus, and their discoveries were part of his temptation. Helluland was Labrador, Markland Newfoundland, Vinland an area extending indefinitely south of New England, and Markland in all probability maintained more or less regular trade and intercourse with the Norse colonies in Greenland in the thirteenth and fourteenth centuries. Approximate determinations of latitude came naturally much earlier than approximations to longitudes; and if only to discount the exaggeration of travellers' yarns, map-makers would show distances westward much too small. Latitudes would naturally be estimated by climatic similarities, and ignorance of the westward ascent of the isotherms would account for Antillia being in the latitude of the Mediterranean, whereas Cuba touches that of Timbuktu.

We think this reasoning at least plausible, but even those who call it merely ingenious will find the book of great interest. It is well illustrated, though the reproductions are much reduced and only one or two are printed on smooth paper. There is an index, and the get-up is very attractive.

Christianity and Civilisation in the South Pacific: the Influence of Missionaries upon European Expansion in the Pacific during the Nineteenth Century. By W. Allen Young. London: Oxford University Press (Humphrey Milford), 1922. *Price 2s. 6d. net.*

The somewhat lengthy title of this book fairly represents its contents, if we add that the author limits his argument largely to British New Guinea, which he regards as offering the best illustration of his point. His object is both to defend the missionaries against undeserved attacks, and to prove that British missionaries

contributed "a new principle to colonial statesmanship," and that to their idealism "we owe the distinctive character of British Imperialism to-day."

Memories of Travel. By Viscount Bryce. London: Macmillan and Co., Ltd., 1923. *Price* 12*s.* 6*d. net.*

Few parts of the world were unvisited by the late Lord Bryce. Some of his journeys were described in such books as *Transcaucasia and Ararat* and *South America.* Other journeys, however, for various reasons, he did not record in book form, but it was his intention to collect and arrange his impressions of them, possibly in a series of volumes under the title "Memories of Travel." At his death only a small part had been prepared, but we are glad that his widow has seen fit to publish it. The chapters range from Iceland to the South Seas, and from North America to the Altai Mountains, and they date between 1872 and 1921. All readers will, we think, be struck with four aspects of this collection. These are, the charm of the style, the encyclopedic knowledge, the acute and trained observation, and the wealth of allusion. As an example of the last, on opening the book at random we find in the chapter on the mountains of Hungary no less than six references to other parts of the world, and all in less than half a page. The book is a worthy memorial of a great traveller, a great writer, a great thinker.

EDUCATIONAL.

Europe: A Regional Geography. By N. E. Macmunn, M.A., and G. Coster, B.Litt. Oxford: Clarendon Press, 1922. *Price* 4*s.* 6*d.*

This book gives us what must command a sad gratitude, some remnants of Professor Herbertson's own work. The general scheme, the introductory chapter, and the whole skeleton of the Russian section are his. Miss Herbertson handed them over to Miss Macmunn and Miss Coster, and they have endeavoured to complete the work.

If their success is to be judged on the claims made in the Preface, it is far from being pronounced except so far as the book does give an abundance of climatic statistics. The claim to have written a book that is "regional in a true and logical sense" is not supported by any great light on the interaction of Man and his environment. The claim about the character and abundance of sketch-maps is partly justified; but many of these are of areas that any one could make a sketch-map of, *e.g.* the position of Breslau or Adrianople, the Burgundy Gate or the Cheddar Gorge, while in the case of less known and more intricate areas we look for maps in vain. And the claim that "town sites have been treated logically and fully. Throughout the book no town is mentioned without a clear indication of the geographical reasons for its position and importance," is not literally true. For instance, probably the most interesting site in the historical geography of Spain is Toledo, as the most important harbour in France for some years has been Rouen. We are told "at one time Toledo was the capital" (p. 143)—and nothing more. On p. 318 we are told only that "Rouen is the lowest bridge-town on the Seine, which makes it an important route centre; but its wealth comes from its great cotton and linen manufactures." And nothing more.

Throughout the book, indeed, there is a tendency towards reckless or careless general assertions, especially in the economic geography. Even in the physical geography this is not absent. For instance (p. 42) there is a statement about the Norwegian lowland which is true only if we accept Dr. Hans Reusch's suggestion to use the word "lowland" of land up to 200 metres in fiords, but 100 elsewhere. The climate of the Meseta is said (p. 137) to have "*intensely* hot summers," but

the figures given for Salamanca show the mean monthly maximum for July and August to be only 71 F. ; the authors might at least have tried to support their statement by quoting Madrid, with 76 F. . Oporto (p. 145) is said to be "a fine harbour," and the context is commercial, not scenic. If it is a fine harbour commercially, why was the artificial port of Leixões made? And even the Leixões trade with Oporto is entirely by lighter, and the port is not on the Douro at all.

On p. 147 we are told that in Andalusia "along the coast grow sugar, bananas, and dates, while oranges, olives, and grapes flourish *everywhere*." One would scarcely infer that even olives cover only 4 per cent. of the area of Andalusia, while oranges cover only 10 per cent. of the olive area. Even at Elche the date crop does not come to maturity, though the fruit is edible; and the whole of Spain only produces 5000 tons of cane-sugar! It produces fifteen times as much beet-sugar, of which nothing seems to be said.

The Italian section is also misleading. The assertion that there is "no core of old rock" (p. 153) is corrected—implicitly—on p. 168, where the old Tuscan core is mentioned. But the reference to "rice *swamps*" (p. 160) is unfortunate; it is the glacial gravels, *not* the "river banks" (p. 160), that are the great "cheese" pastures; etc.

The same chapter (p. 162) gives opportunity for another comment on both sketch-maps and town-sites. Verona is called—rightly, of course—a critical point on the Brenner route to the south *via* Modena, "and consequently the east to west railway along the Po valley was brought through the town." The railway tried everywhere to skirt the foot of the Alps, the 600-ft. contour; that naturally took it through *all* the valley-mouth sites. And no railway from Verona to Modena is shown on the accompanying sketch-map.

But perhaps the real basis of these criticisms is merely the familiar fact that the completion of the work of another is an arduous and thankless task. L. W. L.

The Pupils' Class-Book of Geography: The Americas. By Ed. J. S. Lay, F.R.G.S. London: Macmillan and Co., Ltd., 1922. *Price* 1*s.* 3*d.*

This latest addition to Messrs. Macmillan's valuable series for pupils of ten to twelve years of age has all the useful features of former volumes, and is specially adapted for study by the children themselves. The exercises on map-reading and the questions at the end of each chapter are really within the compass of the pupils and provide a thorough test of the work done. The sketch-maps and diagrams are abundant and exceptionally clear and striking, as is the type used. The treatment throughout is comparative. A useful illustrated glossary is appended.

The "Explorer" Geographies: The Americas. By James Bruce, B.A., B.Sc. London: G. Bell and Sons, Ltd., 1922. *Price* 3*s.*

In this series Messrs. Bell have struck a new note in geographical books. Here the children are first interested in the story of geographical discovery, and, from experience, we know no more interesting way for seniors to approach the study of a new continent. The main discoveries are brought together in a series of chapters which provide a general survey of the physical features. This leads naturally to chapters dealing with the climate, flora, fauna, inhabitants, products, transport, economic and political life in a natural sequence. A special feature of the book is a group of double-page illustrations conveying in a sort of bird's-eye view the characteristic social and economic features of some of the chief districts. In no other book can we remember to have seen more beautiful and instructive illustrations. Though not exactly adapted for examinees, we can think of no finer set of books being put into the hands of pupils as supplementary readers. A few

minor blemishes may be noted, *e.g.* Yukon is not yet an organised province, the island of St. Thomas now belongs to the U.S.A., and trade winds do not as a rule bring heavy rainfall.

The Human Geographies—Book II: The Atlantic Hemisphere. By J. Fairgrieve, M.A., F.R.G.S., and Ernest Young, B.Sc., F.R.G.S. London: George Philip and Son, Ltd., 1922. *Price* 3*s.*

The names of the authors of this series of three books for Secondary Schools are a sufficient guarantee of the soundness of treatment. Book II, with the somewhat misleading title of "The Atlantic Hemisphere," deals with the Americas and Africa. The treatment is regional, and the physical, economic, and political facts fit into their natural place in the scheme. The treatment throughout is excellent, but the chapter on Wind Systems and Rain Belts and that on the reasons for the origin and growth of towns are specially noteworthy. Chap. x. usefully emphasises man's influence on geographical conditions, a point too often minimised by modern geographers. A highly commendable feature of the book is the valuable use made of illustrative extracts from the writings of modern travellers. The book is fully illustrated with diagrams and sketch-maps which really elucidate the text. Exercises attached to each chapter should be of great assistance to the busy teacher or to the private student. In chap. xiii. the authors retain the doubtful derivation of the name Quebec from the French. Teachers in Secondary Schools would do well to examine this excellent series.

The Wonderland Geographies: From Mountain to Sea. By E. G. R. Taylor, B.Sc. Vol. I. London: Geographia, Ltd. *Price* 3*s. net.*

This, the first volume of a new series, is intended for children of seven to eight years of age, and if the succeeding volumes are of the same high standard the series should be a popular one. The fundamental idea worked out in this book is the circulation of the waters from the mountains to the sea and back by way of the air and all that it entails. The child is introduced in a simple way to all the basic conceptions on which the science of geography is built, especially from the human point of view. The explanations are simple enough to be comprehended by young children, but the author's reputation as a scientist and geographer is a sufficient guarantee that the foundations laid are such as will not require relaying at a later stage of the pupil's development. No better beginners' book could be wished for. A useful appendix containing hints to teachers using the book is given.

Maps and Survey. By Arthur R. Hinks, C.B.E., M.A., F.R.S. Second Edition. Cambridge: University Press, 1923. *Price* 12*s.* 6*d. net.*

This book was reviewed here on its first appearance in Vol. xxix. p. 615. The present issue is hardly a new edition in the strict sense, for the original chapters have been reprinted without alteration, corrections and additions being inserted in a new chapter. Further, other chapters have been added giving some account of the new developments in maps and survey which took place during the war period. At a later date the author hopes to be able to prepare a completely new edition of the book.

Abrégé de Géographie physique. Par Emm. de Martonne. Paris: Armand Colin, 1922. *Prix*, 15 *francs.*

Prof. de Martonne's *Traité de Géographie physique* established itself so promptly as a text-book for advanced students that it is only natural that a desire should

have been widely expressed to see the gist of its contents brought within the reach of more elementary students. The *Abrégé* is intended to meet this demand. The general arrangement is the same as that of the original book, with one notable exception. Many readers of it felt that if the author included a chapter on bio-geography there was no logical reason why he should not take a further step and add a chapter on human relations to the physical environment. This has been done in the *Abrégé*, where the final chapter is entitled *L'Homme et la Nature*. It seems probable that this chapter owes its presence largely to Prof. de Martonne's recent work as editor of the late Prof. Vidal de la Blache's *Principes de Géographie humaine* (cf. review, p. 136). Brief though the chapter is, it contains a number of suggestive points, and the book as a whole should prove of value to geographical students here able to read French.

Britain as a European Power. By ANDREW BROWNING, M.A. Glasgow: Collins, 1922. *Price* 3*s.* 6*d.*

It is no light matter to compress the whole history of Britain, from its dawn to the present day, into a small volume of 304 pages. Mr. Browning has, however, succeeded in compiling a very readable text-book, and one which should induce students to make further research into history. He deals with Britain, not as an isolated Power, but as a European influence, and he gives an excellent outline of her position as such. His standpoint in some ways differs from the majority of text-book writers, for he touches very lightly on military events. Little mention is made of the usual glorious deeds of knights and men-at-arms. He deals more largely with industrial development and with the appearance of a large wage-earning urban population. He ends with a chapter on the "League of Nations" and the problems of "no more war."

"The 'Citizen of the World' Geographies." *The British Isles of To-day.* By J. F. UNSTEAD, M.A., D.Sc. London: Sidgwick and Jackson, Ltd., 1922. *Price* 3*s. net.*

In the present volume the author maintains the high standard of the previous issue in this series. A praiseworthy feature is the illumination of the text by quotations from different authors. This idea might well be more widely copied in geography text-books, as it is an undoubted fact that if a geography teacher merely knows, consults, or teaches from the average text-book written in a matter-of-fact and often dry-as-dust way, his teaching is inevitably commonplace and uninspiring. But his power over language and his ability to keep up the inherent interest of his subject are greatly increased by his reading and using in his teaching fine descriptive passages from books of travel and literature generally, and, in that several good extracts are included, this "British Isles" is to be commended to teachers.

Surely it is time that the statement—"'Tweed' cloth, named after the river"—on page 130 should disappear from up-to-date geographies.

BOOKS RECEIVED.

EUROPE.

The Fabric of Europe: An Historical Survey of International Relations. By HAROLD STANNARD, M.A. Demy 8vo. Pp. 260. London: W. Collins and Co., Ltd., 1923. *Price* 10*s.* 6*d.*

Place Names of the Highlands and Islands of Scotland. By ALEX. MACBAIN,

M.A., LL.D. With Notes and a Foreword by WILLIAM J. WATSON, M.A., LL.D. Demy 8vo. Pp. xxxii + 381. Stirling: Æneas Mackay, 1922. *Price* 21*s.*

Island of Skye. The Scottish Mountaineering Club Guide. Edited by E. W. STEEPLE, G. BARLOW, and H. MACROBERT. Crown 8vo. Pp. 126. Edinburgh: Published by the Scottish Mountaineering Club, 1923.

The French Alps. The Blue Guides. Edited by FINDLAY MUIRHEAD and MARCEL MONMARCHE. 25 Maps and Plans. Crown 8vo Pp. xxxiv + 255. London: Macmillan and Co., Ltd., 1923. *Price* 10*s. net.*

Switzerland with Chamonix and the Italian Lakes. The Blue Guides. Edited by FINDLAY MUIRHEAD, M.A., F.R.G.S. 78 Maps and Plans. Crown 8vo. Pp. lviii + 512. London: Macmillan and Co., Ltd., 1923. *Price* 15*s.*

Tirol. Vorarlberg und Teile von Salzburg und Kärnten. Handbuch fur Reisende von KARL BAEDEKER. Mit 55 Karten, 10 Plänen, und 11 Panoramen. Crown 8vo. Pp. xl + 512. Leipzig: Karl Baedeker, 1923.

A Mediæval City in Greece: Its Churches and its Ruins. By Rev. J. ARNOTT HAMILTON, B.D. Pp. 15. Aberdeen: W. Jolly and Sons, 1921. Presented by the Author.

The Church of Kaisariani in Attica: Its History, Architecture, and Mural Paintings. A Study in Byzantine Art. By Rev. J. ARNOTT HAMILTON, M.A. Pp. 28. Aberdeen: W. Jolly and Sons, 1916. Presented by the Author.

ASIA.

The Mystery Rivers of Tibet. By Captain F. KINGDON WARD, F.R.G.S. Demy 8vo. Pp. 316. London: Seeley, Service, and Co., Ltd., 1923. *Price* 21*s.*

Japan und die Japaner. Eine Landeskunde. Von Dr. KARL HAUSHOFER. Royal 8vo. Pp. 166. Leipzig: B. G. Teubner, 1923.

Sibirien. Eine Landeskunde. Von Dr. ARVED SCHULTZ. Medium 8vo. Pp. viii + 246. Breslau: Ferdinand Hirt, 1923. Vol. III., July 1923.

AFRICA.

The Vegetation and Soils of Africa. By H. L. SHANTZ and C. F. MARBUT. Crown 8vo. Pp. x + 263. New York: American Geographical Society, 1923. *Price* $5.00.

Unconquered Abyssinia as it is To-day. By CHARLES F. REY, F.R.G.S. Demy 8vo. Illustrated. Pp. 312. London: Seeley, Service, and Co., Ltd., 1923. *Price* 21*s.*

Equatoria: The Lado Enclave. By Major C. H. STIGAND, O.B.E. With an Introductory Memoir by General Sir REGINALD WINGATE, Bart., G.C.B. Royal 8vo. Pp. xliii + 253. London: Constable and Co., Ltd., 1923. *Price* 21*s.*

AMERICA.

In the Heart of the Canadian Rockies. By JAMES OUTRAM. With Maps and Illustrations. Royal 8vo. Pp. viii + 466. London: The Macmillan Company, Ltd., 1923. *Price* 16*s.*

L'Île Percée: The Finial of the St. Lawrence or Gaspé Flaneries. By JOHN M. CLARKE. Royal 8vo. Pp. xii + 203. London: Oxford University Press, 1923. *Price* 12*s.* 6*d.*

Down the Mackenzie through the Great Lone Land. By FULLERTON WALDO. Illustrated. Demy 8vo. Pp. xii + 251. New York: The Macmillan Company, Ltd., 1923. *Price* 14*s.*

Hunters of the Great North. By VILHJALMUR STEFANSSON. With Illustrations. Demy 8vo. Pp. 288. London: George G. Harrap and Co., Ltd., 1923. *Price* 6*s.*

Old Indian Trails. By WALTER MCCLINTOCK, M.A. Illustrated. Demy 8vo. Pp. xii + 336. Constable and Co., Ltd., 1923. *Price* 21*s.*

Manitoba, Canada: Its Development and Opportunities. By F. H. KITTO, F.R.G.S. Pp. 157. Ottawa: Dept. of the Interior, 1923.

The Land Systems of Mexico. By GEORGE MCCUTCHEN MCBRIDE, Ph.D. Crown 8vo. Pp. xii + 204. Research Series No. 12. New York: American Geographical Society, 1923.

The Handbook of Jamaica, 1923. By FRANK CUNDALL, F.S.A. Demy 8vo. Pp. 705. London: Edward Stanford, 1923. *Price* 8*s.*

GENERAL.

The Great Capitals: An Historical Geography. By VAUGHAN CORNISH, D.Sc. Demy 8vo. Pp. xii + 296. London: Methuen and Co., Ltd. *Price* 12*s.* 6*d.*

The Story of Early English Travel and Discovery. By A. WADDINGHAM SEERE, B.A. Crown 8vo. Pp. 240. London: George Harrap and Co., Ltd., 1923. *Price* 2*s.* 6*d.*

The Last Secrets: The Final Mysteries of Exploration. By JOHN BUCHAN Illustrated. Demy 8vo. Pp. xiv + 303. Edinburgh: Thomas Nelson and Sons, Ltd., 1923. *Price* 5*s.*

The Times Diary and Index of the War, 1914 to 1918. Medium 8vo. Pp. 342. London: Hodder and Stoughton, Ltd., 1921. *Price* £2, 2*s. net.*

EDUCATIONAL.

World Geography and World Problems. By J. F. UNSTEAD, M.A., D.Sc. Demy 8vo. Pp. viii + 280. London: Sidgwick and Jackson, Ltd., 1923. *Price* 4*s.*

A Junior Economic Geography. By O. J. R. HOWARTH. Crown 8vo. Pp. 95. Oxford: Clarendon Press, 1923. *Price* 2*s.* 6*d.*

Major Geographic Regions of North America. By MABEL CLAIRE STARK and DERWENT S. WHITTLESEY. Pp. 45. Illinois: McKnight and McKnight, 1923.

Economic Geography of Indiana. By STEPHEN SARGENT VISHER, Ph.D. Crown 8vo. Pp. viii + 225 New York: D. Appleton and Co., 1923.

Local Geology. A Guide to Sources of Information. By A. MORLEY DAVIES, D.Sc. Pp. 16. London: T. Murby and Co., 1923. *Price* 1*s.*

An Introduction to Stratigraphy. By DUDLEY STAMP, B.A., D.Sc., A.K.C., F.G.S., F.R.G.S. Crown 8vo. Pp. xv + 368. London: T. Murby and Co., 1923. *Price* 10*s. net.*

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United States Geological Survey, Washington.

ALASKA. 1 : 1,250,000. Prepared by the American Geographical Society for the Alaska Road Commission and published jointly. 1923.

This map has been compiled and drawn by W. A. Briesemeister from the publications of the various official surveys.

SOUTH AMERICA.

MAPA DE LOS FERRO CARRILES DE LA REPÚBLICA ARGENTINA. Compilado y construido por la Dirección de Tierras, Colonización y Fomento de los Ferro Carriles de Estado, 1922. Scale 1 : 1,500,000. In six sheets.

While this only purports to be a map of the State Railways, it gives a great deal of information about communications generally. The principal official sources of information appear to have been drawn upon, and altogether, in spite of a slight crudeness in the reproduction, the map is a very serviceable one.

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W. and A. K. Johnston, Ltd., Edinburgh.

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